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CONTENTS

DEPARTMENTS

For complete table of contents see advertising page V

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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 23 MAY, 1940 NUMBER 5

BLINDNESS IN CATTLE DUE TO PAPILLEDEMA

WITH AUTOPSY REPORT ON SIX CASES

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During the past quarter of a century cases of total blindness in calves which were in apparently good general health and had no observable changes in the external structures of the eye have been reported from time to time in this country and in England. The first to call attention in the medical press to this peculiar type of blindness in cattle were Nettleship and Hudson,[1] who in 1913 published data on five cases observed in England, together with an autopsy report on one case. They mentioned that the condition was not unknown to British veterinarians. Since that time, scattered reports of a similar type of bovine blindness have appeared in this country. Many of these reports were by word of mouth or by letter from breeders and are valuable to give body to the general picture rather than as strictly scientific data. Nevertheless, a number of fairly well-controlled observations have been made and ophthalmoscopic findings published. The results of more or less complete gross and microscopic examinations have been made known. The general history and the ophthalmoscopic findings have been sufficiently consistent to justify us in assuming that we have here a definite clinical entity. There has been, on the other hand, no such consistency in the few and often meager pathologic descriptions, which have left the etiology open to speculation. In addition to the five cases reported by Nettleship and Hudson, 16 cases of blindness in calves, apparently similar in type to the condition described by these authors, were reported by Crocker[2] in 1919. These calves were found in two herds in Pennsylvania. An isolated case of the same type of blindness was discovered in 1926 in a herd in England and reported by MacCallan and Mann[3] with ophthalmoscopic and microscopic studies of the right eye. In the following year Summers[4] described the findings in the left eye of the same animal. In 1931 de Schweinitz[5] reviewed the cases reported up to that year, and added (1) results of an inquiry conducted with the coöperation of Marshall of the Veterinary School of Medicine of the University of Pennsylvania, which disclosed apparently similar cases in other Pennsylvania herds and in herds in the states of Delaware, New Jersey, Texas, and Washington, and (2) unpublished cases voluntarily reported to him personally. A further series of cases of blindness in calves was published by de Schweinitz and De Long[6] in a later communication.

In the majority of cases reported, the animals have belonged to the Guernsey breed. In MacCallan and Mann's case

the calf was a Red Devon, and one of the personal communications made to de Schweinitz and De Long concerned a Jersey animal. The greater number of reported cases have been discovered in pure-bred herds, as is perhaps but natural. Both male and female animals are affected; males, however, much more frequently than females.

Affected calves may be born blind or may become blind at any time during the first year of life. In the latter event, the blindness usually appears to come on suddenly. On a number of occasions, those in charge received their first intimation that anything was amiss when the sightless young animal began bumping against fences. The eyes presented no signs of inflammation and no external evidence of injury or disease. The general health was not affected, nutrition and growth were normal. In the few reported cases in which affected males have been permitted to grow to maturity, no loss of breeding power has been observed.

De Schweinitz and De Long, from a careful comparison of the findings in cases observed by themselves and in cases found in the literature, summarize the important pathologic lesions of the type of blindness in cattle here under discussion as follows: "Enlargement of the optic disc depending on marked increase in its neuroglia and swelling of the cell bodies; atrophy of the nervé elements and of those of the optic nerve, the optic tracts and chiasm; marked degeneration of the retinal ganglion cells; no gross intracranial lesions, but definite edema of the cerebral hemispheres." Perivascular edema was noted in their personally observed cases.

The pathologic findings on the optic nerve and tract and the bony optic canal have not been uniform. A finding of apparently much significance, constriction of the bony canal and constriction of the nerve, has been mentioned in some reports and stated definitely to be absent in others. Crocker[2] noted "stenosis of the optic foramen or canal . . . and pressure atrophy." Summers[4] observed "a block of fibrous tissue in the nerve." Allen[7] found constriction at one place in the optic nerve and at this point a spot of softening. Porter[8] noted a constriction distal to the chiasm in each nerve—"in the right nerve separation was complete; in the left, nearly so." De Schweinitz[5] did not find constriction in his cases.

According to de Schweinitz and De Long, the ophthalmoscopic pictures observed fall under two types: In the one type there is papilledema and its later stages; in the other, papilledema associated with hemorrhage and chorioretinitis. They found that the ophthalmoscopic picture of the nerve head will differ in accordance with the stage reached by the disease at the period of the examination. There may be as yet no elevation of the nerve head, but only a finely spun layer of pinkish-gray material covering the optic disc. In a second period, after from 6 to 11 months, a definite choked disc of from 3 to 3.5 diopters may be in evidence. In a still later period, manifesting well-marked atrophy of the optic nerve, the edema will have subsided and the nerve head will be flattened out and grayish white in color, the caliber of the veins will be reduced. De Schweinitz observed this last stage of the ophthalmoscopic picture in a four-year-old Guernsey male, blind since the eighth month of life but otherwise in excellent condition.

A variety of theories of origin have been offered: inbreeding, a hereditary condition analogous to Leber's disease, bacterial or protozoal infection, food poisoning, and dietary factors. Crocker[2] ascribed the blindness in a Guernsey male calf observed by him to "insidious rachitis due to disturbance in metabolism of

minerals, especially lime salts, following overfeeding of dams with highly nutritious foodstuffs, resulting in rachitic deformation" in the fetus of bony parts adjacent to the course of the optic nerve, with compression and ultimate atrophy of the nerve.

It has been difficult to get direct data on the role of heredity in the production of this particular type of blindness in cattle. Most of the affected calves have been slaughtered shortly after their blindness has been discovered; that is, before maturity. Two of the males in the pedigreed herd recorded by Nettleship and Hudson[1] produced progency, and the latter were normal, so far as Nettleship and Hudson could ascertain. A personal communication made by Redding to de Schweinitz and De Long tells of breeding experiences with two males which were themselves the results of a mating between a pure-bred Jersey male and a pure-bred cow, both normal. At five months of age the male calves were discovered to be totally blind. They were used for breeding purposes for seven years and none of their progency was blind, until, by accident, a cow sired by one of them was bred to a male sired by the other. The result of this mating was a male calf born blind. Here we would seem to have a recessive condition manifested only when two "recessives" are bred to each other. De Schweinitz and De Long also put on record a communication made to them by Mr. J. S. Clark concerning a Wisconsin breeder of registered Guernseys who had regularly bred sire to daughter for 30 years and who had 10 blind heifers in his herd. One of his earlier males was blind.

Apart from the question of hereditary transmission is the observed fact of intrauterine origin. In certain of the cases reported, total blindness had been present at birth. In other cases blindness appeared at an early age and the pathologic changes were so far advanced when discovered that it appears indisputable that they had begun and even made considerable progress before birth, since the time that had elapsed after birth would have been insufficient for their development. Influences acting on the fetus through the mother thus deserve the fullest consideration.

Experimental diets have been known to lead to blindness in cattle. In some instances the effect was observed in the animals subjected to the diet, in other instances it was observed in the young that were being carried during the period of the feeding experiment. This subject has been reviewed by Moore[9] and his coworkers. There is a vitamin-A type of blindness characterized by inflammation of the structures of the external eye. But there are also reports of blindness following feeding experiments in which the external eye showed no evidence of inflammation but changes in the optic nerve were found on post-mortem examination. Delez[10] saw marked contraction of the optic-nerve trunk, with atrophy of the fibers at the site of the contraction, in a calf fed on rations of corn-distillers' grain, corn gluten, cottonseed meal, and wheat straw, with addition of alfalfa hay and corn ensilage for a portion of the period of the experiment. And in a second calf, similarly fed, the microscope revealed axial degeneration of the central portion of the optic nerve. Out of 30 calves subjected to this feeding experiment, only these two became blind. Delez does not give ophthalmoscopic findings.

In 1935 Moore, Huffman and Duncan[9] published observations made on 24 calves whose blindness was apparently produced in the course of feeding experiments which were a part of an investigation of the dietary factors present in good-quality hay. The blindness of these animals was not associated with inflam-

mation of the external eye but was characterized by dilated pupil even on exposure to bright light. Pathologic examination showed that the blindness was due to atrophy of the optic nerve where it passed through the optic foramen from the brain. When the nerve and the bony canal were sectioned, it became apparent that the constriction could be due to narrowing of the bony canal. In certain cases the blindness was discovered shortly after birth from a dam subjected to the feeding experiment; in other cases a similar type of blindness developed in young calves given a ration containing roughage of poor quality. In the animals whose blindness was of intrauterine origin, there was in many cases an associated partial paralysis, together with weakness, a peculiar manner of holding the head, and sometimes epileptiform seizures. The only other suggestion of nervous disorder found in the literature on spontaneous blindness in calves is the "tendency to walk around in circles, or the habit of making peculiar motions with the tongue," mentioned by Nettleship and Hudson.[1] The rations in the feeding experiments carried out by Moore[9] and his co-workers consisted of concentrates with poor-quality roughage and various supplements. These investigators came to the conclusion that corn ensilage, timothy hay, and cod-liver oil contain the factor or factors necessary to prevent blindness in calves due to constriction of the optic nerve.

Mellanby[11] has noted widespread nerve degeneration in young dogs fed diets deficient in vitamin A and rich in cereals. Complete deafness was present in some of the animals, which he attributed to nerve degeneration due to an overgrowth of bone of the labyrinthine capsule. He expressed the belief that the degeneration of other nerves might be due to the pressure caused by overgrowth of bone in the various foramina.

Guilbert and Hart[12] established the relationship of night blindness and vitamin-A deficiency in the bovine, and by use of the night-blind condition worked out the minimum requirements for vitamin A. In their paper they expressed the opinion that the blindness reported by Moore *et al.* was due to vitamin-A deficiency but offered no direct evidence to support the belief. Kuhlman, Gallup, and Weaver[13] reported the development of xerophthalmia and a permanent type of blindness in calves fed a ration of beet pulp and cottonseed meal. The xerophthalmia was cured by the use of vitamin-A supplements, but these had no effect on the permanent type of blindness. Rabbits have been found by Phillips and Bohstedt[14] to be capable of developing a syndrome similar to that observed in calves when exposed to the type of diet which induces the symptoms in the latter animals. Phillips and Bohstedt report that carotene in oil exerts both preventive and remedial activity in respect of this syndrome in rabbits. The rabbits exhibiting the syndrome, it should, however, be pointed out, failed to develop constriction of the optic nerve and no ophthalmoscopic observations were reported.

Hale[15] published data showing that vitmain-A deficiency caused congenital anophthalmos and other conditions to develop in swine.

Experimental

We are able to report ophthalmoscopic and post-mortem observations on six calves which became totally blind as the result of being placed on an experimental diet completely lacking in hay of any sort and in corn ensilage and without cod-liver oil.

The animals used for the experiment were of the Holstein breed. They were

from 26 to 31 days old when they were placed on the diet.

The ration fed was skim milk, "Rice Krispies," yeast, viosterol, carotene, minerals, and milk of magnesia.

The milk of magnesia was given to prevent the development of magnesium deficiency, which often occurs in calves on this type of diet. The mineral fed was a solution of copper, iron, and manganese. The viosterol, 20 drops of which (250 D) was given to each calf daily, furnished vitamin D, and the yeast the various B complexes. The carotene was a source of vitamin A but was apparently not fed in sufficient quantities as the animals grew.

C-249 received bran in place of the "Rice Krispies" and milk of magnesia. C-259 received 20 grams of McCollum's salt mixture ♯185 in addition to the above ration.

In five of the animals the blindness was first noticed between 266 and 289 days after the feeding experiment was begun. One animal remained on the experimental diet 487 days before blindness was noticed. In all, the blindness was complete when first noted, although loss of vision had undoubtedly been a gradual process.

The most significant ophthalmoscopic finding was edema of the papilla of 2 to 4 diopters. This was present in all the animals. Vascular engorgement was noted in a number of cases and chorioretinitis in one. A few small hemorrhages on or near the nerve head were observed.

TABLE I

DATA ON CALVES PLACED ON DEFICIENCY DIET

Calf	Age When Placed On Ration days	Age When Blindness Was Noticed days
C-217	30	487—Convulsion at 514 days.
C-249	28	317—Diarrhea at 346 days. Wobbly and weak at 354 days.
C-253	26	292—Died at 361 days of pneumonia.
C-257	31	298—Light convulsion at 296 days, weak and wobbly at 300 days.
C-258	31	301—Blindness complete.
C-259	31	298—Wobbly at 296 days.

The post-mortem examinations showed, grossly, constrictions of the bony optic canal and narrowing of the optic nerve. In calf C-249 the right optic-nerve tract showed complete atrophy, only a fine fibrous cord remaining. In calves C-257 and C-258 the brain showed considerable congestion. In three of the animals—C-253, C-257, and C-259—there

TABLE 2

DIET GIVEN TO SIX CALVES ON DEFICIENCY REGIME

Animal	Skim Milk Pounds Per Day	Polished Rice, Lbs. Per Day	Viosterol USP Unit	Carotene[1*]	Salt Mix[2*]	Yeast Grams Per Day	Milk of Magnesia, c.c., Per Day	Age, in days Placed on Experiment	Age, in days Blindness First Noticed
C-217	20–40	1–2	667	11,280	14	25	110	30	487
C-249	20–30		667	11,280	14	25		28	317
C-253	14–30	.5–2.0	667	11,280	14	25	110	26	292
C-257	14–30	.5–1.0	667	11,280	14	25	110	31	298
C-258	20–40	.5–2.0	667	11,280	14	25	110	31	301
C-259	20–40	.5–2.0	667	11,280	14[3*]	25	110	31	298

[1*] Trade name Caritol.
[2*] Salt Mix contains copper, iron, and magnesium.
[3*] Plus 20 gm. McCollum Salt Mix ♯185.

was cystic degeneration of the pituitary. The cyst was located between the lobes in each case. In calf C-257 the hypophyseal cyst measured 7 mm. in diameter.

The thoracic and abdominal viscera presented few changes of any significance.

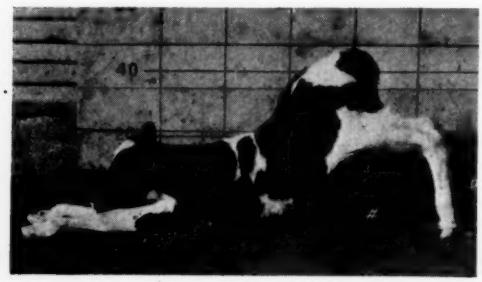

Fig. 1 (Wetzel and Moore). Type of paralysis observed in several calves of Moore, Huffman, and Duncan's series.

In the lungs, bronchopneumonia was a common finding. In only one animal was there any important change in the liver. This animal showed central necrosis in the lobules and some indication of fatty degeneration, apparently of recent origin. The kidneys exhibited a greater degree of damage, with injury to the glomeruli and tubules. In calf C-217 there was proliferation of the cells lining Bowman's capsule—the first instance, so far as we have been able to ascertain, in which this change has been noted in the bovine. Proliferation of the endothelium in the smaller arteries of the kidney was a frequent observation, and there was occasionally a thickening of the intima.

The ophthalmoscopic and post-mortem findings on each of the six blind calves in this series follow, and the details of the diet as applied to each animal may be seen in table 2.

Fig. 2 (Wetzel and Moore). Sections through bony optic canal of normal calf and of three blind calves.

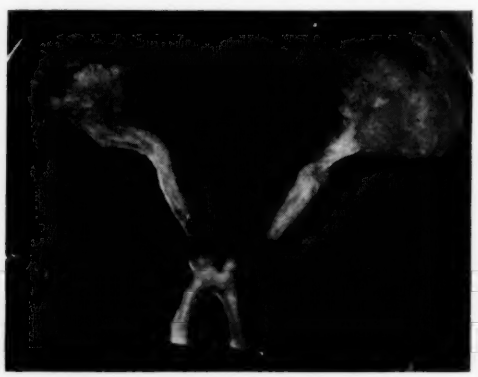

Fig. 3 (Wetzel and Moore). Globes and optic tracts of a blind calf, showing constriction anterior to the chiasm.

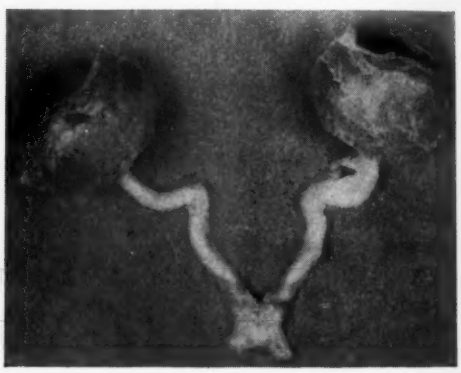

Fig. 4 (Wetzel and Moore). Normal globes and optic tracts of a normal, healthy calf.

Figure 1 shows the type of paralysis observed in several calves of Moore's series. Figure 2 shows sections through

the bony canal of a normal animal and of three of the blind calves of our series. In figures 3 and 4 a pair of constricted optic nerves may be compared with a pair of normal optic nerves.

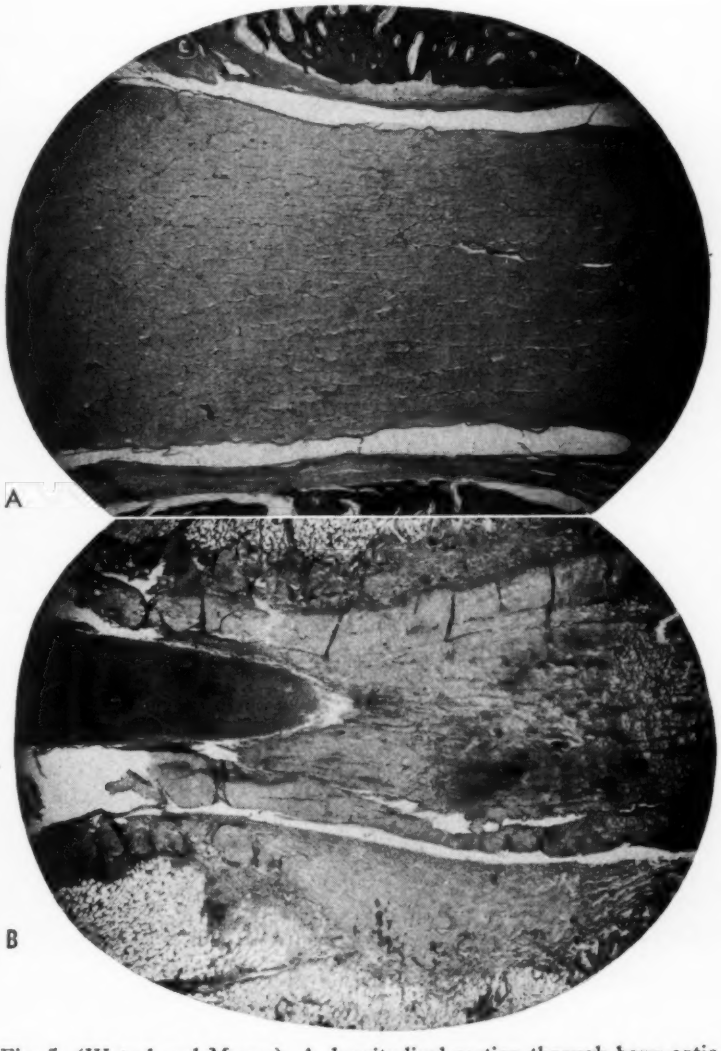

Fig. 5. (Wetzel and Moore). A, longitudinal section through bony optic canal of normal calf. B, the same, of blind calf. Magnification 16 x.

Figure 5 shows a longitudinal section through the bony optic canal of a normal animal (A) and of a blind animal (B) under the microscope, and figures 6 and 7 show photomicrographs of a cross section of the optic nerve in the bony canal in a normal and in a blind calf. In figures 8A and 8B may be compared a posterior-segment section of the optic nerve of a normal animal and a similar section of the optic nerve of a blind animal, showing papillary edema. Figure 9 shows the microscopic picture of the cystic degeneration of the pituitary in one of the blind calves.

OPHTHALMOSCOPIC AND POST-MORTEM EXAMINATIONS

Calf C-217

Ophthalmoscopic examination—right eye: The pupil was not completely dilated, it reacted slightly to light. There was a slight blurring of the disc margins; a grayish-pink substance, which resembled an epipapillary membrane, covered the disc. The vessels appeared to be definitely engorged and those closer to the disc were somewhat tortuous. No other evidence of gross pathology was noted. *Left eye:* The pupil was completely dilated. There was a choking of the disc of 2 diopters, with a small hemorrhage on the nerve head. The whole retina was edematous and hyperemic. There was no evidence of chorioretinitis.

Gross pathology: The right optic tract appeared to be normal. The left optic tract showed a definite constriction at the exit of the nerve where it joins the chiasm. At the exit of the right optic nerve there was a small hemorrhage in the vaginal sheath of the nerve.

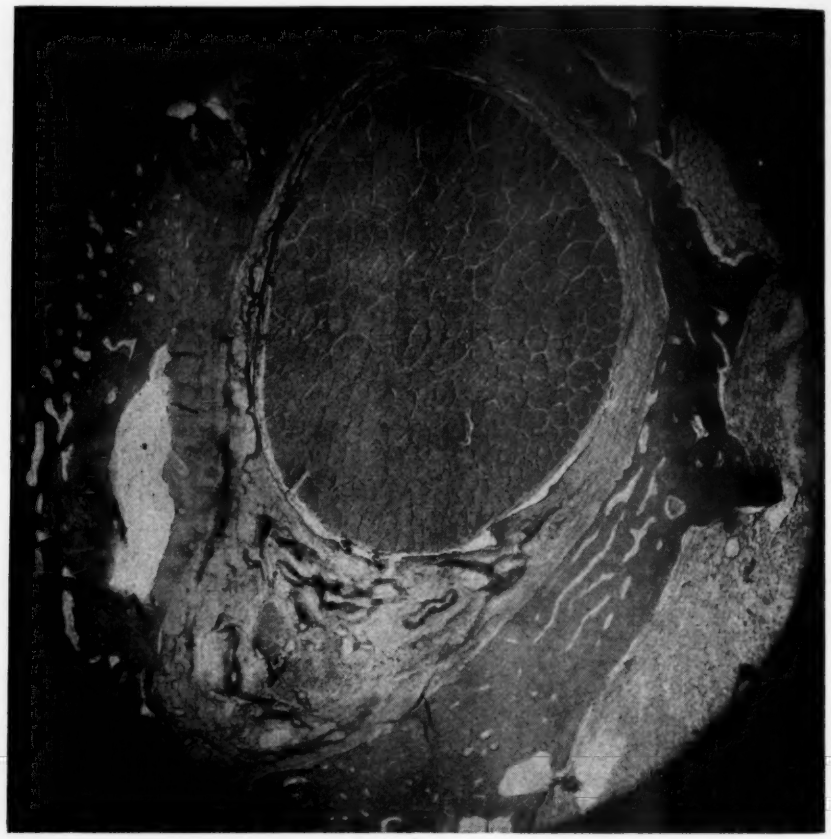

Fig. 6 (Wetzel and Moore). Cross section of optic nerve in bony canal of a normal calf. Magnification 16 x.

Microscopic examination of viscera—kidney: There was some proliferation of the cells lining Bowman's capsule. The glomeruli showed evidence of considerable injury—intracapillary proliferation, swelling, degeneration, and adhesions to

Bowman's capsule. Some glomeruli contained eosin-stained debris. In a number of the glomeruli there was a thickening of Bowman's capsule. There was some proliferation of the endothelial cells and thickening of the intima in several of the smaller arteries. The spleen, liver, thymus, and adrenal showed no significant changes.

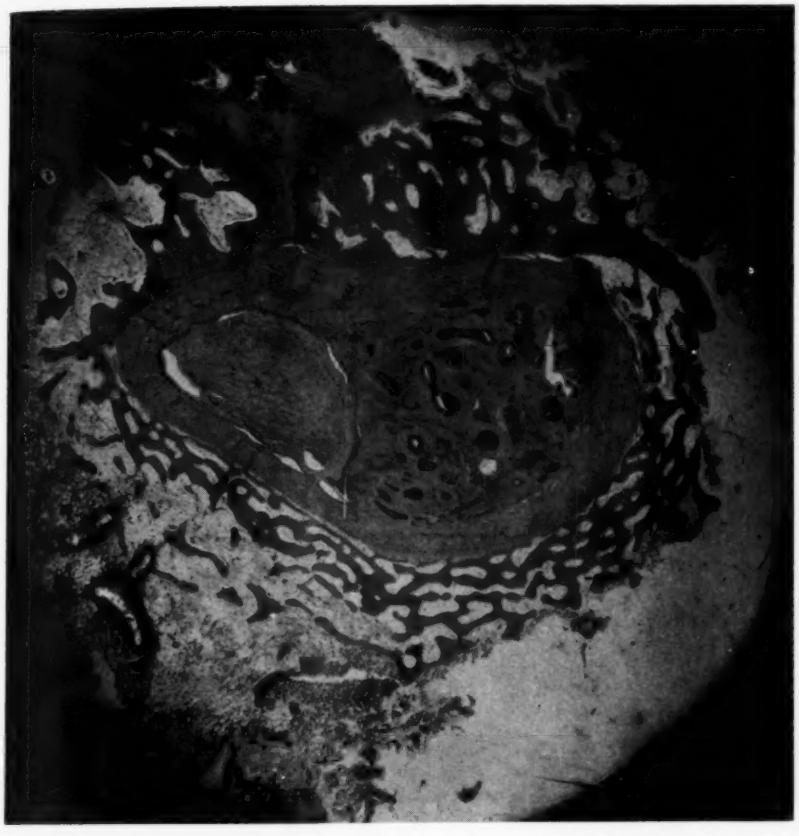

Fig. 7 (Wetzel and Moore). Cross section of optic nerve in bony canal of a blind calf. Magnification 16 x.

Calf C-249

Ophthalmoscopic examination—right eye: The pupil was not completely dilated. There was a papillary edema of 2 diopters. An occasional small hemorrhage was seen near the nerve head. *Left eye:* There was a papillary edema of 3 diopters, but no other evidence of fundus pathology.

Gross pathology: The left optic tract showed some constriction, but not as much as was seen in some of the other animals of the series. The left optic nerve showed a constriction about 1.5 cm. from the chiasm. The right optic foramen had been destroyed on dissection. The right optic nerve tract showed complete atrophy with a fine fibrous cord remaining. The vaginal sheath of the right optic nerve appeared to be thickened. The lungs showed bronchopneumonia. Otherwise, there was no significant gross pathology found.

Microscopic examination of viscera—kidney: Marked intracapillary proliferation and swelling of the glomeruli and of the epithelium of the tubules were seen. The spleen, liver, and adrenal showed no significant changes.

Calf C-253

Ophthalmoscopic examination—right eye: There was choking of the disc of 2 diopters and fairly marked venous engorgement with edema. *Left eye:* There was choking of the disc of 3 diopters, and the same venous engorgement with edema seen in the right eye.

Gross pathology: The pituitary body showed a marked cystic condition. The lungs showed bronchopneumonia. The liver presented a stippled appearance and there was some mottling. Otherwise, the organs showed no significant changes.

Microscopic examination of viscera—kidney: Acute glomerulonephritis was present. The liver presented considerable central necrosis in the lobules; also some indication of fatty degeneration. The injury appeared to have been in effect for a short period of time.

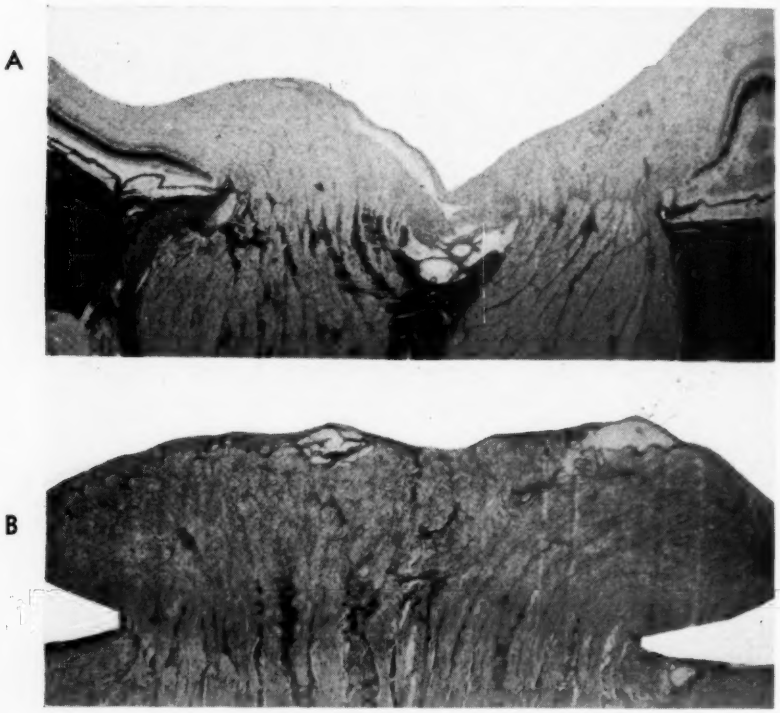

Fig. 8 (Wetzel and Moore). A, posterior-segment section of optic nerve of a normal calf. B, similar section of optic nerve of a blind calf, showing papillary edema. Exact magnification 16 x.

Spleen, thymus, and adrenal showed no significant changes.

Calf C-257

Ophthalmoscopic examination—right eye: Examination showed a posterior polar opacity in the lens, laminated in character. The disc showed a choking of 2 diopters. There was a peculiar pigmented lesion in the inner nerve-fiber layer, ro-

settelike in form. The surrounding retinal pigment had a violaceous appearance. *Left eye:* Examination showed a choking of the disc of 2 diopters. A similar type of lesion to that described in the right eye was seen in the left, what in the human eye would be the macular area having the same violaceous coloring of the surrounding pigment. There was also present a well-defined chorioretinitis.

Gross pathology: The optic nerves showed constriction 1.5 cm. from the chiasm. The brain showed considerable congestion. In the pituitary body, situated between the lobes, was a cyst measuring 7 mm. in diameter. The lungs presented bronchopneumonia. Otherwise no gross pathological changes of significance were found.

Microscopic examination of viscera—kidney: There was considerable injury to the glomeruli and considerable tubular necrosis, mild glomerulonephritis. Spleen, liver, thymus, and adrenal showed no significant changes.

Calf C-258

Ophthalmoscopic examination—right eye: The pupil was well dilated. A well-defined pupillary membrane was present. There was a marked venous engorgement with edema. *Left eye:* The pupil was well dilated. The disc showed a choking of 2 diopters. Many small hemorrhages were present on the papilla. There was marked venous engorgement with edema.

Gross pathology: The left optic canal showed a bony constriction, terminating in a funnel-shaped outlet. The right optic canal did not show the same degree of constriction as the left, but it was constricted. The brain showed some congestion. Otherwise, no gross changes of significance were found.

Microscopic examination of viscera—kidney: The glomeruli show marked injury—swelling, intracapillary proliferation, and distortion—and contained considerable debris. The tubules showed some necrosis. The injury appeared to be acute, more severe than that seen in C-257, but not so far advanced. The spleen and thymus showed no pathologic changes of significance.

Fig. 9 (Wetzel and Moore). Cystic degeneration of pituitary body in one of the blind calves.

Calf C-259

Ophthalmoscopic examination—right eye: The pupil was completely dilated. There was a choking of the disc of 4 diopters. The entire retina appeared to be edematous and hyperemic. *Left eye:* There was a large posterior polar opacity of the lens. The disc shows a choking of 4 diopters. The retina was edematous and hyperemic.

Gross pathology: The right and the left bony optic canals were constricted, the right canal more than the left. The right

optic nerve showed a definite constriction about 3 cm. from the optic chiasm. Pigmentary changes were present at the point of constriction. The constriction continued well up the nerve tract to a point about 1.5 cm. from the entrance of the nerve to the globe. The left optic nerve showed a small constriction about 1.5 cm. in length. The pituitary contained a cyst, situated between the lobes, which had ruptured in dissecting out. This cyst was not sufficiently large to produce any elevation noticeable before removal. No other significant pathologic changes were found.

Pathologic aspects and questions of pathogenesis

From the data thus far studied it appears evident that the blindness in calves which followed the feeding of the experimental diet used by Moore, Huffman, and Duncan[9] and by us was caused by atrophy of the optic nerve at the place were it passes through the bony canal. That this atrophy was due to pressure of the bone upon the nerve is suggested by study of sections made through the bony canal and nerve (figures 5, 6, 7) and by observing in other cases the narrowed opening through which the nerve must pass. Moore *et al.*[9] point out the possibility "that the nerve first degenerated and that the canal through the bone did not enlarge as growth proceeded." But they add that "it is difficult to conceive that the degeneration of the optic nerve, if it were due to causes other than pressure, would always occur at the same place." Assuming bony pressure as the cause of the nerve atrophy, we have still to seek the cause of the constriction of the bony canal. Crocker,[2] as has been mentioned, ascribed the "stenosis" of the bony optic canal in his case to rachitic deformation of the bone. But ash and mineral analyses made of some of the bones in Moore, Huffman, and Duncan's series did not reveal a rachitic condition, nor did X-ray pictures of the ribs. The calcium and inorganic-phosphorus values in the blood of the blind calves of their series failed to reveal any correlation between blindness and low blood calcium and inorganic phosphorus. Moore and his co-workers examined the bones from several of their animals for exostosis, with negative results. The appearance of the bony canal was such as to suggest that pressure had been applied to it from above, causing it to become narrower as growth proceeded. The position of this particular structure was such that it would be subjected to pressure from above if sufficient intracranial pressure were developed. This type of blindness develops, as far as we now know, only in the growing animal, while bone is still sufficiently soft to yield to pressure. The only symptom attributable to increased intracranial pressure exhibited by the blind calves during life was spasms. As a rule the spasms occurred after the blindness had developed and could be brought on by excitement of any sort. But such spasms might also be an expression of vitamin-A deficiency.

Nutritional aspects. Moore and his co-workers presented evidence that the factor or factors necessary to prevent the type of blindness due to constriction of the optic nerve is present in corn ensilage, timothy hay, and cod-liver oil. The evidence points toward vitamin A as the factor involved in this syndrome, although, as pointed out by Moore and his co-workers, "it seems doubtful that vitamin A could be concerned with such bone malformations, but such an explanation might be plausible if the absence of vitamin A in some indirect way raised the intracranial pressure."

In two of the animals considered in this paper spasms occurred which are sometimes found associated with vita-

min-A deficiency. Whether or not there is any direct relationship between the spasms and the development of the blindness is difficult to state. Studies are now in progress in an attempt to determine the pathologic background of the spasms. There is undoubtedly, however, considerable disturbance of the central nervous system.

Three of the animals in this group showed a wobbly gait, a symptom which is quite often associated with vitamin-A deficiency and would further indicate an organic disturbance.

The weight of the gathering body of observations pointing to vitamin-A deficiency as concerned in the causation of the syndrome in cattle described in this paper has been substantially increased by experimental work carried out by one of us (Moore[16]) since the observations were made on the six animals considered in this report.

Three-months-old calves were placed on a ration which provided only around 2 to 3 micrograms of carotene per pound of body weight. The minimum requirement is held to be approximately 14 micrograms per pound of body weight. On this ration the symptom picture as described in the foregoing report began to appear. At different stages in the development of symptoms, vitamin A in the form of alfalfa hay was added to the basal ration in amounts of from one to four times the estimated minimum requirement, and the effects observed. In two calves crystalline carotene was added after the animals had been on the ration long enough to deplete their vitamin-A reserve but before the appearance of definite symptoms to test the efficacy of carotene in preventing the development of the syndrome. The results were as follows:

Alfalfa hay sufficient to supply the minimum requirement of carotene, given in addition to the small amount of carotene contained in the basal ration, promptly cured partial night blindness but did not cause the edema of the nerve head to subside in 314 days of supplemental feeding.

Twice the minimum requirement of carotene in the form of alfalfa hay added to the basal ration after permanent blindness had developed in one eye preserved the sight of the second eye.

Addition of four times the estimated minimum requirement of carotene in the form of alfalfa hay cleared up papillary edema of both eyes (choking of 2 diopters), but the recovery process was slow. Night blindness in the same animal reacted promptly to the added vitamin A.

Low plasma carotene values were present on the basal ration, unsupplemented.

Crystallized carotene dissolved in cottonseed oil and given to two calves on the low carotene ration in amounts equal to 10 times the estimated minimum requirement for the first 70 days and thereafter reduced to 4 times the estimated minimum requirement prevented the development of any ocular or clinical symptoms or marked ophthalmoscopic change. Calves on the same basal ration, which did not receive the added carotene, developed permanent blindness together with the other clinical symptoms and ocular changes.

Of the various changes apparently dependent on vitamin-A deficiency, night blindness and papillary edema occurred usually at about the same time, but they result from different processes. Papilledema is due to increased intracranial pressure and night blindness to depletion of the vitamin-A content of the retina, where its presence is seemingly necessary for regeneration of visual purple. Constriction of the optic nerve is a later development. With the increasing evidence pointing to papilledema as a regular precursor of blindness from constriction of

the optic nerve—it was present in all six animals comprising the experimental basis of this report—and with the direct evidence produced by Moore that vitamin-A deficiency can cause papilledema, it becomes possible to explain the mechanism by which vitamin-A deficiency could produce narrowing of the bony optic canal on which the constriction of the nerve could depend. In cattle the structure and relationship of the cranial cavity and optic canals are such that intracranial pressure occurring at a time when the bone is still growing could readily result in the malformation of the canals. It is noteworthy that while papilledema is sometimes seen in full-grown cattle, constriction of the optic canal has never been reported as developing after the close of the growing period. It is further noteworthy that such constrictions have been found only in the segment of the nerve which is enclosed within the bony canal.

The exact amount of carotene received by the six calves of this report cannot be stated with accuracy, but apparently the vitamin-A intake was below the actual minimum requirement. From the data presented in table 1 it can easily be reckoned that 487, 317, 292, 298, 301, and 298 days on the experimental ration were necessary to produce noticeable indications of blindness in these six calves. In Moore's calf, which became blind in one eye and in which the process leading to blindness was arrested in the other eye before vision was destroyed, this blindness was evident after 135 days of a low-carotene ration without a supplementary carotene feeding. It would seem that the carotene which our animals received delayed, though it was not sufficient to prevent, the development of the permanent type of blindness.

Summary and conclusions

1. Blindness due to constriction of the optic nerve and associated with papillary edema has been observed in six calves on an experimental ration.

2. The constriction of the optic nerve appears to have been caused by faulty development of the bony canal, probably due to increased intracranial pressure.

3. These ocular alterations were associated with epilepticlike seizures and wobbly gait.

4. The evidence indicates that these ocular manifestations are of nutritional origin and probably due to deficiency of vitamin A in the rations.

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SCINTILLATING SCOTOMA AND OTHER SUBJECTIVE VISUAL PHENOMENA*

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The consideration of this topic was suggested to me when I was recently called in consultation in a case occurring in the practice of a colleague to whom the history of phenomenon experienced by the patient suggested retinal pathology. On examining the eyes, aside from a very slight degree of arterial sclerosis manifest in retinal vessels, and a few drusen, no departure from the normal was found. Vision was normal.

The patient, a man of about 60 years, complained of experiencing flashes of light before the left eye followed by temporary loss of vision. This had occurred a number of times at irregular intervals. The patient had not experienced headache, nor had he been nauseated. The blindness had been on the left side and was thought to affect the left eye only. The patient's arterial tension at systole ranged from 180 to 210. He was a man of sedentary habits, in fair health. Careful questioning developed a diagnosis of scintillating scotoma without hemicrania.

Personal experience. The writer has experienced attacks of scintillating scotoma over a period of 15 or 20 years. The

On Monday afternoon a meeting was held at the Lodge of Queens' College and it was resolved that a Petition of the members of the said College presented to the Lords against the Irish Church Bill. Dr. Phillips, the Master of Queens, kindly consented to act as chairman, and Mr. Potts, of Trinity, undertook the part of Secretary. It was decided, that the Petition should not be offered for signature to any Members of the Senate who are Peers, Bishops, Judges, or Members of the House of Commons. [illegible] signatures were received. Of these [illegible] could not be found in the Register of Members, others were not of sufficient standing, and the names could not be deciphered. After these [illegible] number of signatures attached to the Petition exceeded [illegible]

The following [illegible] circulated among the Members of the Senate, [illegible] the Petition. We, the [illegible] the Senate, were present at the [illegible] June, when the following Memorial [illegible] of the Senate was taken into consideration:

[More follow the Memorial and the 80 signatures, see p. 0]

By an adverse vote of eight against seven the Vice-Chancellor being one of the seven: a decision was come to which prevented the wishes of the Memorialists from being complied with.

Fig. 1 (Weeks). "Spotty vision." The small circle indicates the fixation point (from Gowers[3]).

attacks appear at irregular intervals, three or four days to six or eight months, apparently when the physical processes are a little below normal. Attacks develop at any time during the day or early evening

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*Read at a meeting of the Western Ophthalmological Society at Timber Line Lodge, Oregon, April 8, 1939.

irrespective of occupation at the time; never at night. Usually the first intimation of an attack is a slightly confused "spotty" vision (fig. 1), an area of dim-

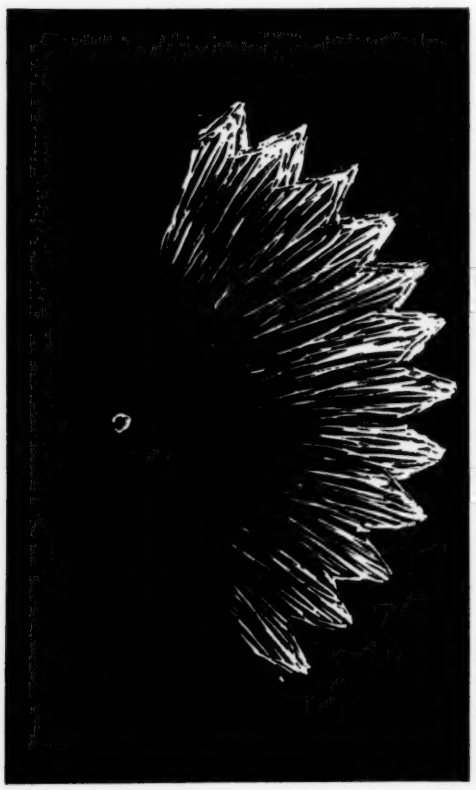

Fig. 2 (Weeks). The arc when full; color of burnished steel, lines scintillating. As the scotoma appeared to the author, September 21, 1939. Small circle is fixation point.

ness, a relative scotoma* developing at the same time at the right of the fixation point, binocular and homonymous. A small luminous area soon appears near the right outer border of the relative scotoma and a little above the level of the fixation point, due to flashes of light occurring in closely associated, more or less parallel, narrow, glowing lines. This area soon develops into an arc, the convexity to the right, largely in the upper quadrant of both fields. The outer margin of the arc is serrated, zigzag, suggesting the formation of fortification redoubts, ever changing. The inner margin is not serrated. It fades into the dim area of the relative scotoma. The arc is thickest at its middle portion, gradually narrow-

Fig. 3 (Weeks). Drawing by Dr. Hubert Airy of scintillating scotoma as it appeared to him when at the maximum. The small circle indicates the fixation point.

ing at its extremities, including, when full, about two fifths of a circle. There are no colors other than luminous lines and the dark, slightly brown area of the scotoma. The arc of flickering luminosity increases during a period of 10 to 15 minutes, then gradually diminishes (fig. 2). Complete recovery from the disturbance takes place in 20 to 30 minutes, without leaving a trace It is not followed by headache nor any other sequela. The

* A scotoma is an isolated area of depressed sensitivity enclosed in the visual field—*Duke-Elder.*

phenomenon is most distinct on looking at a dark surface or on placing some opaque covering over the closed eyes. The arc never develops into a complete circle, and never affects the left side of the visual fields.

Various forms of scintillating scotoma are described by others who have experienced the phenomenon. The arc presents various irregularities. A luminous area only, connected with the relative scotoma, is experienced by some. Various colors of the spectrum, chiefly red and blue, are detected, intermingled with the flashes of light. The zigzag angulation varies greatly as seen by different observers[1] (fig. 3).

Although quite a high percentage of the cases of scintillating scotoma are not followed by any form of cephalalgia, the phenomenon is so frequently followed by hemicrania, or by cephalalgia affecting the entire head, that it has been termed ophthalmic migraine.* Undoubtedly both forms are due to the same cerebral angioneurosis, the one followed by cephalalgia affecting a wider area of the brain cortex.

Relative scotoma is not infrequently experienced as a visual disturbance without the element of scintillation as a forerunner of hemicrania, because of this the cephalalgia has been termed "blind headache." The headache following these visual phenomena may continue two or three days and may be accompanied by nausea and vomiting. The visual disturbance is always *binocular* and *homonymous*. The patient often thinks that one eye only is affected.

The visual phenomena just described may be accompanied by aurae affecting other regions of the body, particularly the integument and mucous membrane in the upper part of the body, in the form of formication. Weakness of the extremities may be experienced. The duration of these aurae is about the same as in scintillating scotoma. These aurae differ from those of epilepsy, or simple fainting, in that they are never instantaneous.**

A case reported by Pollat[2] relates to a woman, aged 52 years, who experienced scintillating scotoma. The attacks were frequent, sometimes a number in one day. She also suffered from "dead fingers," which would occur on the slightest exposure to cold. The vasomotor neurosis is related to, but not identical with, Raynaud's disease.

Gowers,[3] in his excellent and exhaustive Bowman's lecture entitled "Subjective visual sensations," under the heading *Migraine*, compares the sensations of epilepsy with those of migraine, writing as follows: "The two groups present a marked contrast in most of their features and yet are not without common features and connecting forms. The epileptic sensation is extremely brief and is followed by loss of consciousness or/and convulsions. The migraine sensation is deliberate, slow in evolution, occupying more minutes than the seconds during which the epileptic sensation exists. It is followed not by a convulsion lasting minutes but by a headache lasting hours. Yet just as the epileptic sensation may occur alone as the slightest form of attack, so the spectrum of migraine may occur alone without succeeding headache."

I know of no authoritative statement in regard to the age at which scintillating scotoma is experienced. I am of the impression that it rarely occurs before the age of 25 years; certainly it is not com-

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* The word migraine is a French derivative from the Latin hemicrania.

** For a detailed description of accompanying symptoms in other parts of the body to angioneuroses see Gowers. "Diseases of the nervous system. Amer. ed., 1888, p. 1179.

mon in early life. Galezowski maintains that the visual-aura migraine occurs later in life, at 30 to 50 years, than does ordinary migraine.

In my own case the phenomenon was not experienced before I had passed the age of 50 years. Of the cases reported, of which there are many in the literature of the nineteenth century, the youngest patient whose history I have encountered was 31 years of age.

The central origin of scintillating scotoma is now generally conceded. This is manifest by the frequent accompaniment of hemicrania with the homonymous hemianopic character of the visual disturbance. The transient character of the phenomena must be due to transient vascular changes consequent on nerve impulses to the walls of the blood vessels in the visual centers on the side opposite to the portion of the visual fields in which the phenomena appear, constituting a cerebral angioneurosis. The various other manifestations of cerebral angioneurosis connected with the phenomenon of scintillating scotoma are, undoubtedly, due to extension of the angioneurosis to adjacent portions of the cerebrum, accounting for the hemicrania, the temporary weakness of the extremities, aphasia, formication of cutaneous surfaces, and other conditions.

Fuchs[4] writes: "The circulatory disturbance sets up an irritation of the optical elements, an irritation which according to the laws of projection is referred to the external world and appears under the form of a colored scintillation, while at the same time the perception of peripheral impressions is abolished. So also at the beginning of a fainting attack, which in fact is likewise due to circulatory disturbance in the brain cortex, symptoms make their appearance which are perhaps identical with scintillating scotoma."

The visual phenomena may, and with some people frequently do, constitute the whole of the seizure, the subsequent headache being absent. The case of Dr. C. H. Parry of Bath, England, narrated by Liveing[5] is interesting and is here given.

"After violent fatigue, more especially when accompanied with fasting for 8 or 10 hours, which has often happened to me, I have frequently experienced a sudden failure of sight . . . when I looked at any particular object it seemed as if something brown, and more or less opaque, was interposed between my eyes and it, so that I saw it indistinctly or not at all. Most generally it seemed to be exactly in the middle of the object, while my sight comprehending all around it was distinct as usual. . . . At other times . . . the cloud was on one side of the direct line of vision. After it had continued a few moments the upper or lower edge (I think always the upper) appeared bounded by an edging of light of a zigzag shape, corruscating nearly at right angles to its length, the corruscations always appearing to be in one eye; but both it and the cloud existed equally whether I looked at an object with one eye or with both eyes open. When I shut both eyes, covering them with my hands so as to exclude all rays of light, the corruscation was still perceptible in the same place, and what had been a semi-opaque cloud (relative scotoma) appeared lighter than before. . . . In this way they would remain from 20 minutes sometimes to half an hour, the cloud lessening as the corruscations continued, and the latter sometimes rather suddenly going off. They were, in me, never followed by headache, but seemed evidently connected with the state of the stomach; for though they occurred without any feeling of indisposition at the time, they generally went off with a movement in the stomach producing eructations."

The visual phenomenon may be limited to a partial obliteration of vision, a simple relative scotoma without spectral appearances.

In a case referred to by Liveing, he says:[5] ". . . We have an absence of discerning vision over a certain part of the field of view giving the sensation, not of darkness, but of blankness, and next we have certain spectral appearances . . . namely, a series of iridescent points produced by interesting zigzags in rapid motion." In this case severe headaches followed, attended by nausea and sometimes vomiting, and by a degree of mental disturbance consisting of a vague sense of dread.

John Abernethy[6] (1764-1831), a celebrated English surgeon, was apparently subject to attacks of scintillating scotoma to which he alluded humorously when lecturing to students at St. Bartholomew's Hospital, London, as follows . . . "I then perceived for the first time in my life an imperfection in my sight. I could not see more than two thirds of an object. . . . I found that it arose from the eclipse of the third of every object on the right-hand. I ascertained this particularly as I went home, because if I saw such a long name as my own, for instance A-ber-ne-thy. . . . I could see A-ber-ne, but I could not see the thy at all. Well, I looked with one eye, then I looked with the other, and I looked with both, but still I perceived that the third of every object was eclipsed on what I may call my right side. . . . I have often been entertained by it. . . . My opinion is that is arises from the irregular actions of the retinae."

Etiology

Liveing, having mentioned irregularities of the stomach as the forerunner of the attacks in a number of patients, mentions the case of a Dr. Fothergill who describes his own case as follows: "After breakfast, if much toast and butter have been taken, it (the attack) begins with a singular kind of glimmer in the sight; objects swiftly changing their apparent position, surrounded by luminous angles like those of a fortification. Giddiness then comes on with headache and sickness."

The cerebral angioneuroses here considered appear to be brought about by a number of conditions. It is thought that heredity is a factor in the development and continuation of hemicrania. Disorders of digestion, a depressed condition of health, overwork, especially of a sedentary type, the absorption of ptomaines from diseased teeth, tonsils, or whatever focus, appear to favor development of scintillating scotoma.

After an exhaustive review of all the hypotheses concerning the etiology of migraine following scintillating scotoma, Sir Wm. Osler[7] concludes, "The general hypothesis of a vosomotor disturbance seems to account for the most of the facts and the general position here taken is that such disturbance may be continued by a host of causes. The view advocated then admits that a certain amount of fact exists in practically all of the hypotheses but maintains that a one-sided mode of interpretation is inadmissible."

The phenomenon of scintillating scotoma is in no way related to retinal arterial spasm except that both are due to an angioneurosis. The prognosis in the first is very favorable; all effects disappear with the passing of the excitation. The phenomenon of retinal arterial spasm is, in the greater number of the cases, associated with arterial sclerosis and is an intimation of possible eventual serious impairment of vision.

In connection with the consideration of scintillating scotoma we may consider the phenomenon of hallucinations sometimes accompanying homonymous hemi-

anopia. They are undoubtedly due to a disturbance of visual cells in the cortical center similar to that which occurs in scintillating scotoma. They may persist for some hours or for some days during the early stage of the development of the hemianopia. The writer has obtained a history of this phenomenon in two cases, both occurring in women of advanced age. In one patient the hallucinations were of marble columns and mantels in changing combinations. The patient was seen at her residence about 24 hours after the onset of the hemianopia. At that time the hallucinations were active. The irides reacted to the stimulus of light from all parts of the retinae. In the second case, vague figures occupied the hemianopic fields together with trees and shrubs. In this case the hallucinations were noticed for some days after the onset of the hemianopia. The Wernicke sign was negative, as in the first case, indicating a lesion in or near the cortical visual center.

De Schweinitz[8] reports a case as follows: "Case V . . . was that of a patient, aged 29 years, in good health until his twenty-fifth year when he began to have asthma. Some months before his admission to the University Hospital there was morbid sleep, and a month later a convulsion, general in character, followed by a number of similar attacks, until he became irrational and violent, remaining so for 24 hours. The examination of the eyes demonstrated . . . left-lateral hemianopia. . . . The preserved fields were much contracted. . . . Preceding the hemianopia the patient had seen vision of chairs, tables, and other articles of furniture in the fields which afterward were obliterated. The hemianopia was then complete and although he told me of these hallucinations, for he was then rational, he was not able to state positively whether they disappeared immediately after the hemianopia set in or whether they remained some time in the dark half fields. . . . At the postmortem there was found gummatous infiltration at the base of the brain pressing on the right tract, in association with more or less edema of the pia-mater and meninges."

Dr. Frederick Peterson,[9] under the title "Homonymous hemiopic hallucinations," reports a case occurring in a paranoic patient as follows: "His visual hallucinations are singularly limited to the right visual areas of each eye, so that we may, in fact, speak of them as homonymous hemiopic hallucinations. He sees at times, skeletons and various people, always moving about and upon his right side, and this is true if either eye is shut. They never appear upon his left side. If he directs his eyes toward the right side where the visions appear, they move still farther toward the right. . . . His hallucinations are conjoined with delusions of persecution." In regard to the hemianopic hallucinations Dr. Peterson writes, "Their limitation to the right visual fields of both eyes is absolute proof of their central origin, and they doubtless arise through irritation in the cortical visual area of the left occipital lobe."

In commenting upon a similar case, Dr. Seguin wrote, "It seems to me that these hallucinations represent the irritation of the cortical visual center just previous to its destruction. . . . It is probable that further inquiry will show that hallucinations occur not infrequently at the outset of hemianopia."

In the same article Dr. Peterson presents the history of a case reported to him by Dr. John Van Duyn of Syracuse as follows:

"Mrs. J., 45 years old, mother of two children. . . . Shortly after the birth of the last child . . . within the first week she began to suffer from piercing pain in the right temple which continued about

two weeks. Then she had trouble with vision. Everything seemed to twinkle, and in all directions it seemed as though everything was surrounded by waving, heated air. . . . Vision was indistinct. . . . After this indistinctness of vision had existed some time she observed that the left half of the field of vision was dark and blind. One week after the occurrence of this blindness, hallucinations appeared in the blind region. Cats and dogs and children arranged themselves in rows and formed processions . . . this continued without any variation and without interruption, except by sleep, for four weeks. The vividness of the scene and the activity of the objects were increased by fatigue or during attacks of headache. After the fourth week the hallucinations disappeared quite suddenly and never returned. The hemianopia has continued."

The aurae of epilepsy are various and are well known. Their duration is very brief. Hallucinations in epilepsy are not common. Peterson reports one case as follows, "John M., age 11 years, has had for two years an attack of grand mal about once a week. Convulsions general. He always has a visual aura of a white star shining to the left."

Peterson mentions the excellent work of Henschen[10] from which he reviews the following: "Case XXII: Male, aged 60. Left hemianopia without hemiplegia. Left-sided visual hallucinations, a certain amount of word-blindness and mind blindness. . . . The hallucinations were of persons and places constantly present for a long period of time, to the left. Autopsy showed softened areas in the right cuneus and lobus lingualis and in the right thalamus."

Dr. Peterson quotes Dr. Seguin as follows: "Irritation from organic lesions and from vascular spasm easily makes clear the origin of homonymous hemiopic hallucinations in most of the cases."

Conclusions

Scintillating scotoma is due to a cerebral angioneurosis affecting the visual cells temporarily without causing their destruction, a phenomenon allied to the cerebro-angioneurosis that determines attacks of hysterical amaurosis, paralysis of ocular muscles, and the explosive cerebral angioneuroses that determine attacks of epileptiform hysteria and epilepsy.

The hallucinations occurring in homonymous hemianopia are due to the disturbances of visual cells at the cortical visual center, antedating their destruction by the process that determines the hemianopia. The hallucinations never resemble the visual phenomena of scintillating scotoma.

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AN EXPOSITION OF SOME ROUND MACULAR LESIONS*

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Round macular lesions are of unusual interest to the diagnosing ophthalmologist, not only because of their distinctive shape, but also on account of the wide variety of pathologic processes that occupy this vulnerable region, the similarity of the early signs, and the great divergence in end results. Traumatic destructions are not included in this résumé.

Preretinal edema was reported before fundus photographs were made, but since 1926, which marked the beginning of the period of wide interest in clinical fundus photography, many illustrations have been published, and since 1928 the author has shown, in some of his exhibits at state and national meetings, several cases with a round, gray swelling in front of the macula.

The typical edematous zone progresses, increasing in size and in swelling. The margin of the elevation appears as a dark line, best seen with an arc lamp, a narrow slit beam, or a binocular ophthalmoscope. The retinal vessels run beneath the raised zone, which is usually a horizontal oval in the center of which the dark macula lies on a level measurably deeper than the surface of the lesion. The base may be of a uniform pink color, although not infrequently it is granular or studded with minute brownish or yellowish dots. Stereoscopic photographs confirm the correct diagnosis, which may be made only with difficulty, or not at all, with an ordinary ophthalmoscope.

Some writers have referred to this as localized detachment of the retina.

PRERETINAL EDEMA

Case 1. M. T., male, aged 39 years, stated that for the past three weeks he had noticed a dark spot before the right eye. Vision was 20/30. The pupil was 3 mm., and responded normally to light stimuli. The media were clear and, with the exception of a round area of macular edema, 2.5 disc-diameters in size, over which the so-called foveal reflex was absent, the fundus was normal. There was an absolute central scotoma of 6 degrees.

Eleven days later the fluid in front of the retina covered an oval space 3.5 by 4 disc-diameters in size. The region was darker than its surroundings, there was a gray crescent at the lower edge of the macula, and a few fine yellow dots were seen over the reddish macula.

The edema subsided and the border became less defined and merged into the rest of the fundus, and a very delicate haze of minute granules appeared in front of the macula.

About six weeks after the patient's first visit—nine weeks after he first noticed symptoms—the edema had disappeared. Two types of spots remained: one, the outer circle, consisted of reflexes many of which were anterior to the retina; the others were in the retina, both in front of and behind the retinal vessels.

An interesting fact is that the patient had never used tobacco or alcohol and had never been ill; the only noteworthy physical findings were two apical abscesses and early hyperpiesia. He responded to treatment, and when last seen the vision was 20/20+. With the exception of the few minute, slightly depig-

* Presented at the seventy-fifth annual meeting of the American Ophthalmological Society at Hot Springs, Virginia, June 5 to 7, 1939.

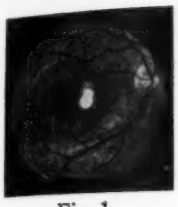

Fig. 1

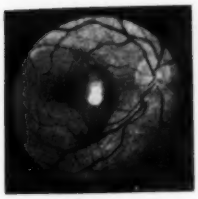

Fig. 2

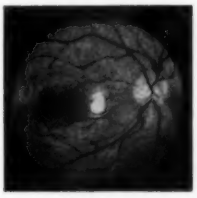

Fig. 3

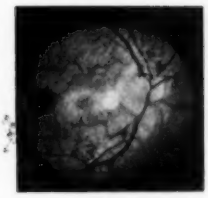

Fig. 4

Fig. 1 (Bedell). Case 1. Preretinal edema. An early stage of preretinal edema. The gray light-reflex arc is to the temporal side, and the cloudy fluid gives the impression of a forward bending of the retinal vessels, but stereoscopically the reverse is true.

Fig. 2 (Bedell). Case 1. Preretinal edema. Two weeks later there is greater swelling; a larger discolored ring and a gray arc reflex are seen on the lower edge of the macula.

Fig. 3 (Bedell). Case 1. Preretinal edema. Nine weeks after the onset. The edema has disappeared. The retinal vessels about the macula are negative. Fine gray dots are seen on the retina in the previously involved area.

Fig. 4 (Bedell). Case 2. Retinitis. Two months after the beginning an elevated gray-yellow oval lies between the macula and the disc. This is hazy, with a faint overshadowing of the vessels.

mented dots, the fundus was normal (figs. 1, 2, 3).

In preretinal edema the foveal reflex, which is really from the vitreous, is absent, but the arcs, lines, or circles may be seen on the surface swelling. The edematous region is usually decidedly darker than the surrounding retina. At times the retina seems to be actually depressed. Gray flecks on the surface provide a simple check and afford points for estimating the degree of swelling.

The ring-shaped light reflex is caused by a collection of the preretinal, not subretinal, fluid. The fluid tends to disappear regardless of treatment. Angiospastic therapy has not demonstrated its efficiency either in shortening the course or in preventing a recurrence.

Guist termed this condition retinitis centralis annularis, and believed that it was caused by retinal ischemia. Photographs fail to show the vessel changes, and ophthalmoscopic examinations do not disclose them. At times it is difficult to evaluate the various signs.

An examination with a Nordenson camera will disclose the existing edema earlier than will any other instrument, and for that reason the ophthalmologist who does not use the camera routinely misses many early signs as well as characteristic late manifestations.

Coincident with preretinal edema, or apart from it, a true retinal edema may be present, with a discoloration of the retina and fine gray dots of exudate or a diffuse exudative clouding.

Localized retinitis

Case 2. A barber, aged 35 years, when first seen complained of a frontal headache that had persisted for three days and the presence of a yellowish circle of light before the right eye. Examination at this time showed that the vision in the right eye was 20/300. The pupil was 3 mm., regular and active, and the media were clear. Between the disc and the macula there was a large, gray, elevated area with an irregular brownish crater-like depression in the center. The surrounding retina was hazy, and there were many wrinkles. The physical examination was negative. When examined two months later, the retinal lesion was more definitely circumscribed, and there was a pale surrounding ring with a darker depressed center. The vision was 20/100, and a paracentral scotoma extended from the 5- to the 15-degree point.

Two months later the vision was 20/50.

Fig. 5

Fig. 6

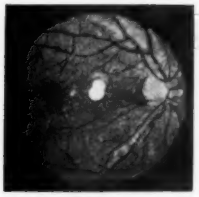

Fig. 7

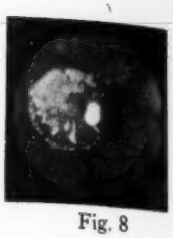

Fig. 8

Fig. 5 (Bedell). Case 2. Retinitis. Two months later. The haze of the retina has decreased.

Fig. 6 (Bedell). Case 2. Retinitis. Three weeks later. The retinal spot is smaller and less elevated, with almost complete resolution; only a faint green reflex remains.

Fig. 7 (Bedell). Case 3. Macular drusen. The minute brilliant spots confined to the macular region lie beneath the retinal vessels.

Fig. 8 (Bedell). Case 4. Macular exudate. A large, nearly flat exudate consisting of delicate and thick masses. The retinal vessels pass over the lesion.

The retina was decidedly clearer, and the lesion was smaller and less sharply defined.

After three weeks there was practically no evidence of the retinitis except for a greenish spot at the site of greatest involvement. The vision was 20/20. A very small scotoma persisted (figs. 4, 5, 6).

Drusen

Case 3. A man, aged 20 years, with a low degree of far-sighted astigmatism. Vision in right eye, 20/20. The pupil was 3 mm., regular and active. The media were clear, and the disc was distinct. The fundus was normal, except in and about the macular region, where there were many bright and several brilliant small dots beneath the retinal vessels (fig. 7).

Cases of this sort may be diagnosed incorrectly as exudates, and cause the patient needless anxiety and subject him to prolonged treatment. Consultants can attest to the frequency with which this nonincapacitating benign change goes unrecognized, especially if large, pigment-capped drusen are present.

Old macular exudate

Case 4. A female, aged 57 years, had been under observation for three years, during which time there had been no change in the fundus appearance. The vision in the right eye was 6/200; with a compound myopic astigmatism correction, 20/50. There was a central scotoma, about 9 degrees in diameter. In the macula there was a medallion that resembled yellow lace, the delicate tracery and overlapping designs bringing into relief the sharp outline of the almost round plaque over which the retinal vessels passed. The left eye was normal (fig. 8).

Macular exudate in a diabetic

Case 5. A female, aged 73 years, had been under treatment for diabetes for many years, and still had 1 percent of sugar in the urine and 250 mg. of sugar per 100 c.c. of blood. The blood pressure was 165/80.

In 1929 the patient had a retinal hemorrhage with exudation between the disc and macula of the left eye.

On January 23, 1939, the vision in the left eye was 3/200. The pupil was 3 mm., regular and active. The disc was clear, the veins were full, and the arteries were contracted. A large oval, white, laminated mass was found in the macular region. A retinal vessel passed over part of it. The right eye was normal except for a few fine striate retinal hemorrhages in the posterior pole (fig. 9).

This is a rare form of macular exudate both as to consistency and as to shape.

ROUND MACULAR EXUDATE

Case 6. A male, aged 43 years, was first seen on June 23, 1938. The vision in the right eye was 4/200, unimproved with any glass. The pupil was 3 mm. wide, regular and active, and the media were clear. The disc was almost perfectly round, with a narrow scleral ring and a small central excavation. The retinal vessels were normal. Two disc-diameters to the temporal side, and slightly below the horizontal level, was a round, yellow, circumscribed mass of exudate that bulged forward about 1½ diopters. The upper and inner edge was dark, with a faint pink cover of a thin layer of blood. The delimiting retinal margin was round and in places almost black.

The field of vision showed 15 degrees of peripheral contraction and a small absolute central scotoma.

The left eye was negative externally, and the fundus showed no deviation from normal. The vision was 20/70; with a mixed astigmatism correction, 20/20.

When next seen, on November 26, 1938, vision was 20/200, with −1.00 D.sph. ⌯ + 1.25 D.cyl. ax. 90°, it was 20/30. The pupil measured in size, 3 mm., regular and active, and the media were clear. The macular area was a trifle darker in color than normal, with a few isolated brown specks in the region of the former exudate. The central scotoma was absent.

This unusual macular exudate, which on cursory examination suggested a macular hole, was most interesting.

On May 14, 1938, the patient had bumped his head on the ceiling at his office. The next day he noticed some blurring of vision, and three days later he consulted Dr. Hulsebosch, to whom I am indebted for the history of the case and the opportunity to follow it. "On May 17th a cone-shaped preretinal hemorrhage was found over the fovea of the right eye. The physical examination was negative. The hemorrhage was almost completely absorbed by June 13th."

Stereoscopic examination showed that the condition was an exudate, not a dissolution of the retina. The appearance, both before and after healing took place, is shown in the illustrations (figs. 10, 11).

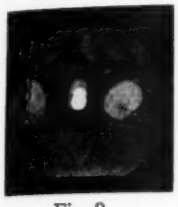

Fig. 9

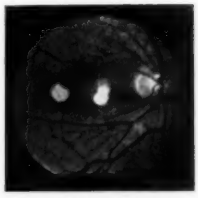

Fig. 10

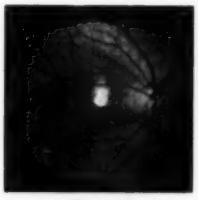

Fig. 11

Fig. 12

Fig. 9 (Bedell). Case 5. Macular exudate in a diabetic. Lamellated projecting white layers with a retinal vessel extending over the deepest layer. A pigmented top.

Fig. 10 (Bedell). Case 6. A round exudate in the macula. A round, elevated, yellow exudate. The dark upper edge shows the remains of a hemorrhage.

Fig. 11 (Bedell). Case 6. A round exudate in the macula. Complete resolution; only a few minute pigment spots remain about the fovea.

Fig. 12 (Bedell). Case 7. Juvenile macular degeneration. A pigmented circular area. Both eyes are alike.

JUVENILE MACULAR DEGENERATION

Case 7. A male, aged 46 years, had worn glasses for 19 years, but had not been able to see well during the past 15 years. No cause for the macular degeneration has been found.

Vision in the right eye was 20/100; with −1.50 D.cyl. ax. 180° it was 20/70. There was a large, gray, irregularly pigmented flat scar in the macular region.

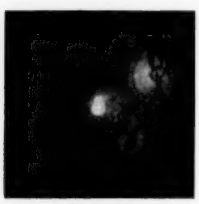

Fig. 13

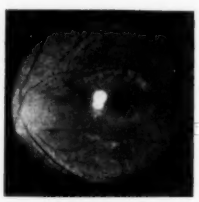

Fig. 14

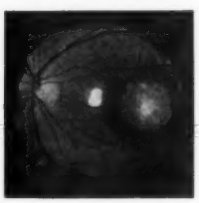

Fig. 15

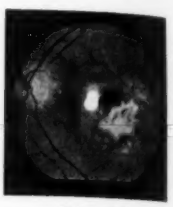

Fig. 16

Fig. 13 (Bedell). Case 8. Juvenile macular degeneration. A dark zone with irregular granular center.

Fig. 14 (Bedell). Case 9. Juvenile macular degeneration. The bright reflexes accentuate the oval macula, which is darkly pigmented.

Fig. 15 (Bedell). Case 10. Juvenile macular degeneration. An unusual type with almost transparent sheet overlying the large area of destruction.

Fig. 16 (Bedell). Case 11. Macular retinochoroiditis. A large, puckered, depigmented ring with thick pigment plaques around a white, uneven scar.

Vision in the left eye was 20/100; with −1.50 D.cyl. ax. 180° it was 20/70. A scar similar to that in the right eye occupied the macular region (fig. 12).

Case 8. A female, aged 20 years, had worn glasses for many years, and had had poor vision for at least 10 years. Vision in the right eye was 20/100, unimproved by a glass to correct a moderate degree of compound hyperopic astigmatism. The pupil was 3.5 mm., regular and active. The media were clear and the disc distinct. In the macular region there was a dark ring surrounding an irregularly pigmented granular center, suggesting a puckered scar. There was a central scotoma, 4.5 mm. in diameter (fig. 13).

Case 9. M. B., female, aged 24 years when first seen. The general examination was negative. The vision in the right eye was 8/200; with a compound myopic lens it was 20/40. The pupil was 3 mm. in size, regular and active. The media were clear, and the disc was distinct. In the macular region there was a mottled, grayish-red scar, 0.5 disc-diameter in size. This was surrounded by a gray zone about 0.2 disc-diameter in width. There was a large central scotoma.

The patient had twin brothers, aged 20 years, and a younger brother, aged 14 years, in whom it was not possible to discover any evidence of a similar condition (fig. 14).

Case 10. C. C., female, aged 20 years, has been under observation for six months, during which time there has been no change in her condition either subjectively or objectively. About six years ago she discovered that the vision in the left eye was poor, and that the eye turned out. She has worn glasses for one year.

The vision in the right eye was 20/70; total refractive error, −50, with no improvement in vision. Externally, the eye was normal. The pupil was 3 mm., regular and active, and the media were clear. The disc was oval, clearly and distinctly outlined, with a small central excavation. The retinal vessels were of normal size

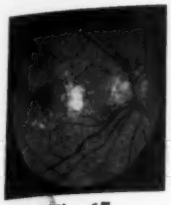
Fig. 17


Fig. 18

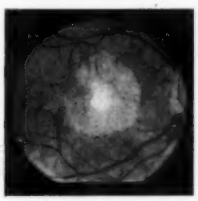
Fig. 19

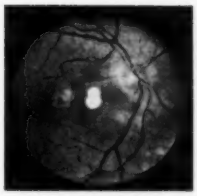
Fig. 20

Fig. 17 (Bedell). Case 12. Choroidal atrophy. A semicircle of irregular pigmentation on the disc side of the macula.

Fig. 18 (Bedell). Case 12. Choroidal atrophy. Six years later. Greater absorption of pigment with an increased visibility of the choroidal vessels.

Fig. 19 (Bedell). Case 12. Choroidal atrophy. Terminal stage, two years later. An almost round area of depigmentation. Relatively little loss of vision.

Fig. 20 (Bedell). Case 13. Macular retinochoroiditis. When first seen. A retinal cyst, infiltration of the retina, and an irregular dark hemorrhage.

and distribution. In the macular region there was an almost perfectly round area, approximately 1.5 disc-diameters in size. This was covered by a glistening membrane showing many clear, vacuolelike spaces. In some places these oval openings extended completely through the veil. Near the center, they were about 0.25 disc-diameter in size. The outline of the destroyed retinal and choroidal area was pigmented with round brown specks. On a definitely deeper level than the border of the lesion there was an atrophic choroid oval, on the temporal side of which a large choroidal vessel was visible. A similar although smaller vessel was seen on the edge nearer the disc. The difference in level between the membrane and the base of the lesion was about 1.5 disc-diameters.

Vision in the left eye was 20/70. Externally, the eye appeared to be normal; divergent, 30 degrees. The media were clear. The disc was slightly oval, and clearly and distinctly outlined. The macular lesion was almost the same as that in the right eye, except that the openings in the membrane were larger and that the deep depression was round and white. The glistening membrane resembled a sheet of crumpled cellophane, and was best seen with a −1.00 D. lens, whereas the base of the lesion was most clearly seen with a −2.00 D. lens. In both eyes narrow retinal vessels passed over the rim of the lesion (fig. 15).

With a red light the pigmented edge resembled a speckled screen, whereas in red-free light the membrane was sharper, the openings were distinct, and the greenish color of the base was perceptible.

There was an absolute central scotoma of about 7 degrees in its greatest diameter.

The diagnosis of juvenile macular degeneration was based on the absence of any demonstrable cause and on the age of onset. There have been no other cases in the family.

Macular retinochoroiditis

Case 11. O. A., female, aged 67 years, had worn glasses for 28 years. She had had her last pair six months, when she complained of seeing a white cloud before her right eye, and two spots that looked like small fishes. Several years before, after intense pain, the vision in her left eye became impaired. Systolic pressure was 132, with no evidence of cardiac decompensation.

Vision in the right eye was 20/70, corrected to 20/20. The pupil was 2.5 mm., regular and active. There were a few

vitreous opacities. The disc edge was clear, and the fundus was normal.

Vision in the left eye was 1/200. The pupil was 2.5 mm. in size, regular and active. A pale macular area, about 2.5 disc-diameters in size, showed the destruction of much of the retina, a collection of dark, almost black, pigment, and an elevated whitish-yellow central scar (fig. 16). The cause was undetermined.

Choroidal atrophy

Case 12. In 1925, when A. B. was 59 years old, the vision was 20/20, with a low degree of far-sighted astigmatism. In 1930 there were a few small areas of choroidal absorption in the macular area. These increased in size and coalesced until, in 1935, the best vision was 20/30, and there was a large yellowish exudate in both maculæ. In 1936 the masses were larger and the vision was 20/30.

When, on December 15, 1938, the latest photographs were taken, the thick, yellow, almost circular masses were elevated above the surface of the surrounding retina like a superimposed thin plaque (figs. 17, 18, 19). With a +1.25 lens vision was 20/30.

A complete investigation failed to disclose the presence of any cause other than a mild general arteriosclerosis. There was no hypertension.

Retinochoroiditis

Case 13. F. M., male, aged 44 years, lost the central vision in his left eye three years ago. Recently he discovered that the vision in the right eye was not so acute. Examination on November 16, 1938, showed the vision of the right eye to be 20/40. The disc was slightly oval, with a clear central excavation. There was slight pigmentation of the temporal border. Between the disc and the macula there was an irregular oval border of fine, dotlike exudates, all of which were beneath the retinal vessels. Near the lower margin, and beneath some of the exudates, there were two large hemorrhages, the darker one overlying the other, which was a paler red. Toward the disc end, and separated from the larger mass, there were a few striate hemorrhages. The macular region was elevated about 2 disc-diameters above the surrounding fundus, which was gray and translucent. The retinal vessels passed over the elevation. There was a 5-degree absolute central scotoma.

Vision in the left eye was 20/200. The scar consisted of a yellow mass with a

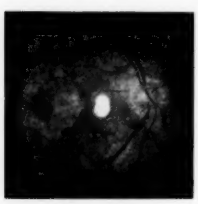

Fig. 21

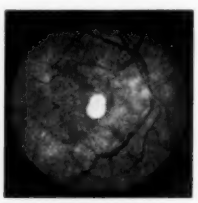

Fig. 22

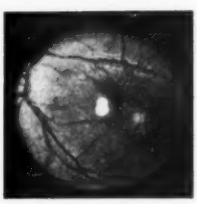

Fig. 23

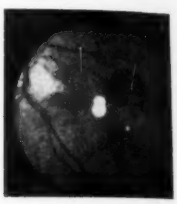

Fig. 24

Fig. 21 (Bedell). Case 13. Macular retinochoroiditis. Three-and-one-half months later. In the expanding stage. Marked swelling and infiltration, with deep and superficial hemorrhages.

Fig. 22 (Bedell). Case 13. Macular retinochoroiditis. Two-and-one-half months later. Much greater surface and deep involvement. Splotches of dark blood and a larger circle of retinal edema.

Fig. 23 (Bedell). Case 14. Retinochoroiditis. An early stage with a white center, retinal edema, and scattered hemorrhages.

Fig. 24 (Bedell). Case 14. Retinochoroiditis. Five weeks later. A wide ring of deep blood, with many radiating folds and diffuse clouding of the retina.

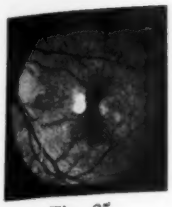

Fig. 25

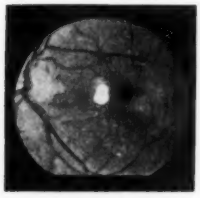

Fig. 26

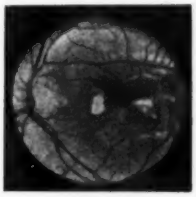

Fig. 27

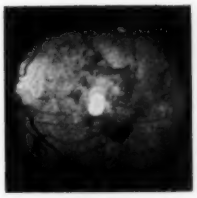

Fig. 28

Fig. 25 (Bedell). Case 14. Retinochoroiditis. Two weeks later. Radiating folds in the retina, with darker and deeper hemorrhages. An ovoid cystic swelling to the outer, lower side of the macula and a ring of bright spots are reflections from the vitreous.

Fig. 26 (Bedell). Case 14. Retinochoroiditis. Six weeks later. The retinal folds are more marked, the hemorrhage is absent, and the cystic swelling is less.

Fig. 27 (Bedell). Case 14. Retinochoroiditis. Six months later there are a few retinal wrinkles, a double arc of reflexes, and a flat, white, pyriform scar.

Fig. 28 (Bedell). Case 15. Senile macular degeneration. Stage of retinal edema. Dark, deep hemorrhages and superficial paler ones.

heavily pigmented border to the temporal and inferior margins, over which the retinal vessels could be traced. Between the scar and the disc there was a small patch of choroiditis with a pale periphery and a pigmented center. The disc was clearly outlined, as in the right eye.

Complete physical examination revealed nothing pathologic except an enlarged prostate.

Four months later the vision of the right eye was 20/200, and there was a very large, elevated gray swelling in the macular region, surrounded by deep hemorrhages and several radiating folds in the retina (figs. 20, 21, 22).

Two months later still the edema of the retina was greatly increased, and involved an area several times the disc-diameter in size. At the top of the lesion there were a few minute hemorrhages, and the retinal vessels that passed over the lesion were irregular in caliber.

The patient is still receiving treatment.

Macular retinochoroiditis

Case 14. C. M., male, aged 33 years. On June 23, 1937, he presented himself saying that he had noticed a spot before his left eye for the past week. There was no history of infection, and a complete physical examination failed to disclose any cause for the ocular disturbance, although the patient stated that he had had a sore throat three months before the examination.

Vision in the left eye was 20/30, with an irregular 5-mm. central scotoma. The pupil was 4.5 mm. in size, regular and active, and the media were clear. In the macular region there was an area about 2 disc-diameters in circumference, slightly inferior to but including the macula. Near the center of this region there was a whitish-yellow circle, about one-third disc-diameter in size. The larger region was outlined by a retinal reflex that appeared brilliant in the photograph. There was also an arc above and below, and several dark, granular hemorrhages were visible.

About five weeks later the change in the eye was striking. Dark, deep retinal hemorrhages formed the base of a large, elevated swelling. There were several folds in the deeper retina. The white central area was less sharply defined, and the retinal vessels passed over the entire mass, as they did at the first examination.

Thirteen days later, when the next pic-

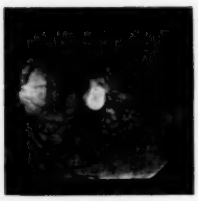

Fig. 29

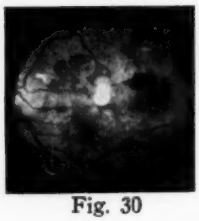

Fig. 30

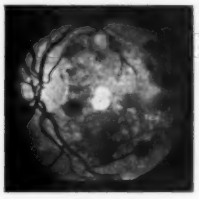

Fig. 31

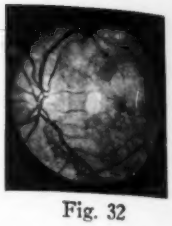

Fig. 32

Fig. 29 (Bedell). Case 15. Senile macular degeneration. Two months later. An expanding ring of exudate and blood.

Fig. 30 (Bedell). Case 15. Senile macular degeneration. Two weeks later the hemorrhagic borders are larger and in places are much thicker.

Fig. 31 (Bedell). Case 15. Senile macular degeneration. Six weeks later. There is granular blood near the disc; the retina is gray and swollen; the deep hemorrhages are absorbing.

Fig. 32 (Bedell). Case 15. Senile macular degeneration. Five months later. A few fresh extravasations parallel the inferior temporal artery. An extensive gray white scar covers a large space, including the macula.

ture was taken, much of the dark retinal hemorrhage appeared to have been absorbed. Near the center of the macular region, and impinging upon the macula, there was an elevated gray oval which contained fluid, and there were several specks of exudate on its surface.

In six weeks the retinal radiations were more marked, and the retinal reflections were less. The cystic degeneration had decreased, and the pale center had disappeared.

Six months later the lesion was quiescent. The retinal reflections were still present, and the scar was flattened. A small central scotoma persisted. Vision was 20/70 (figs. 23 to 27).

Senile macular degeneration

Case 15. B. S., aged 67 years, a railroad foreman, was first examined on November 18, 1937. He had worn glasses for 21 years. When they were changed, four years ago, there was a spot before the right eye. For the past eight months there has been a dense haze before the left eye.

The general physical examination was negative; there was no hyperpiesia. The vision of the right eye was reduced to 20/200. The pupil was 3 mm. in size, regular and active, and the media were clear. There were irregularly outlined deep and superficial extravasations adjacent to a gray, degenerating macula.

Two months later the small crown of blood had been dispersed, but fresh hemorrhages were present in a wider zone.

Within two weeks fresh hemorrhages had appeared, and some of the old ones had been absorbed.

A month and a half later there were several new hemorrhages, some granular, others homogeneous. The retina showed increased degeneration.

Five months later most of the blood had disappeared. There were fresh granular streaks along the inferior temporal artery, and in the posterior pole the retina was gray-white. The large central scotoma persisted, and the vision was 1/200. The patient is still under treatment (figs. 28 to 32).

Summary

Several types of round macular exudate and scars are presented; some are unusual, and many are of unproved etiology, but all are interesting.

The case of preretinal edema is simi-

lar to others that have been exhibited by me during the past 11 years.

Retinitis is readily diagnosed by the proper use of red and red-free light.

Drusen are common and deserve more attention than they have received.

When the ophthalmoscopic light is focused on the side of a lesion, its structural form is more readily discernible than when the illumination is direct.

Some common types of juvenile macular degeneration are shown, with a sufficient number of cases of retinochoroiditis to emphasize the differences.

The life cycle of retinochoroiditis is recorded by serial photographs.

Senile macular degeneration, with its expanding, constantly changing crown of blood, has been depicted, with one of the end results.

Conclusions

Early changes in the macula are best seen with the aid of an arc lamp.

Serial photographs supply the only scientifically accurate method of recording fundus changes.

Before an eye with a macular lesion is enucleated, photographs should be taken.

A complete understanding of the macular-degeneration cycle is necessary.

By means of serial photographs many suspected malignant lesions have been proved to be hemorrhagic, and the globes have been preserved.

344 State Street.

THE EFFECT OF SPLENIC EXTRACT ON CHRONIC SIMPLE GLAUCOMA*

Report of eight cases

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This study was suggested by an article by Miller and Paul who published a very favorable report on the use of splenic extract for glaucoma in 1937.[1] Paul had previously been using it for the treatment of allergic phenomena with considerable success. The possibility that glaucoma might be an allergic manifestation led them to try splenic extract in this disease also, with what seemed to be very encouraging results. Recently Miller[2] published another report on the same subject and felt that there was definite improvement in the patients treated by this method.

The cases to be reported here were selected at random from patients with chronic simple glaucoma attending the glaucoma clinic at the Washington University Eye Clinic, largely because they could and would return frequently enough for the test. They had all been to the allied clinics of the group, and any concurrent disease was being adequately treated. Each was given a large series of skin tests and nasal smears were obtained, which were studied in the Ear, Nose, and Throat Department under the direction of Dr. French Hansel, in an effort to decide whether or not they showed any other evidence of sensitivity to allergens.

Since Miller and Paul felt that the concentrated spleen extract was of no value and that small doses were liable to give

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TABLE 1

EFFECT OF DIFFERENT TYPES OF THERAPY IN EIGHT CASES OF GLAUCOMA

Name	Age Sex Race	Type Gl. and years in Clin.	Total Splenic Ext. Taken c.c.	Symptoms of Splenic Therapy	Tension on Usual Therapy mm. Hg O.D.	O.S.	Usual Therapy	Tension on Splenic and Usual Therapy mm. Hg O.D.	O.S.	Tension on Splenic Therapy Alone mm. Hg O.D.	O.S.	Previous Operations for Glaucoma	Allergy
1. J. M.	37 F W	Chronic simple 9 yrs.	270	None	17–23 av. 20	15–25 av. 19	Pil. 1% t.i.d. O.U.	15–22 av. 19	15–25 av. 18	(14 days) 15–25 av. 20	12–19 av. 18	Trephining O.S.	
2. R. W.	56 M Col.	Chronic simple 3 yrs.	260	None	18–23 av. 22	18–26 av. 23	Pil. 2% q.i.d., O.U. Es. 1% b.i.d., O.U.	15–27 av. 23	15–26 av. 32	(5 days) 16–29 av. 24	16–29 av. 25	None	None
3. L. H.	63 F Col.	Chronic simple 6 yrs.	130	Made her dizzy and confused?	15–40 av. 28	22–28 av. 27	Pil. 2% q.i.d., O.U. Es. 1% t.i.d., O.U.	(7 days) 19–29 av. 26	18–24 av. 22	Not tried		None	
4. A. W.	52 F Col.	Chronic simple 4 yrs.	250	None	25–50 av. 20	14–29 av. 17	Pil. 2% q.i.d., O.U. Es. 1% 1 x d, O.D.	(7 days) 30–40 av. 35	16–18 av. 17	(14 days) 35–41 av. 40	14–18* av. 15	None	
5. D. Y.	41 M Chin.	Chronic simple 1 yr.	380	Objects had blue color during second trial	16–20 av. 18	22–30 av. 27	Pil. 1% 1 x d. O.D. Pil. 1% q.i.d., O.S. Es. 1% 1 x d, O.S.	18–20 av. 19	7-day** av. 18 7-day av. 27	(1 day) 18	35	Iridencleisis O.D.	Yes
6. P. M.	62 M Col.	Chronic simp. O.D. Absolute O.S.—7 yrs.	280	None	8–30 av. 26	35–75 av. 65	Pil. 2% q.i.d., O.U. Es. 1% t.i.d., O.U.	18–25 av. 27	35–75 av. 65	Not tried		Trephining O.D.	Yes
7. R. L.	39 F Chin.	Chronic simp. O.D. Shrunken globe O.S. 3 yrs.	270	None	10–32 av. 22	Soft	Pil. 3% q.i.d., O.D. Es. 1% b.i.d., O.D.	19–29 av. 22	Soft	Went to 30 O.D. without Es. b.i.d.		None	Yes
8. S. J.	53 F W	Chronic simple 3 yrs.	270	None	13–29 av. 18	15–35 av. 21	Pil. 1% t.i.d., O.U.	13–19 av. 16	18–25 av. 22	Not tried		Trephining & cyclodialysis, O.S. Posterior sclerotomy & iridectomy, O.D.	Yes

* Patient continued on pilocarpine 2% once a day, O.S., during this period.
** See note on case 5. The first 7-day combined treatment seemed to help. The second did not.
Eserine used is eserine alkaloid in castor oil.
All averages are estimations from a graphic chart of the tension.
No change in either vision or visual fields was found in any case.
Patients 5, 6, 7, and 8 were definitely allergic persons.

uncertain results, the 40-percent spleen extract (Armour's), as recommended by them, was used, and the patients were given 20-c.c. doses subcutaneously. They were first tested with a 10-c.c. dose to avoid any severe reactions.

The course of treatment consisted of administration of a 20-c.c. dose of spleen extract every day for one week, then a 20-c.c. dose every other day for the next two weeks. The intraocular tension was measured each time the patient came in. The visual acuity was tested frequently, and the visual fields were also checked.

The results during the three weeks of spleen-extract therapy are compared with those obtained in the three weeks preceding and following in table 1.

In cases 3, 6, and 8 no attempt was made to test the effect of splenic extract alone because of the patients' poor vision and small fields. In case 5, the tension immediately rose to 35 mm. Hg, and this trial, therefore, lasted only one day.

The patient in case 3 was a very senile colored woman who was convinced that the injections did her harm although no objective evidence could be found.

In case 1 alone did the extract seem to be just as effective as the ordinary treatment.

In cases 2, 3, 4, 5, 6, 7, and 8 the combination of spleen and regular treatment gave sometimes slightly better and sometimes slightly worse results than those from the usual treatment alone. The difference in every case was small. In case 5 the combination brought down the tension of the left eye from 27 to 18 mm. Hg for a week, but spleen alone would not hold it. When the combination was tried later it had no effect, and at this time the patient complained of "blue" vision while taking the injections.

Conclusions

The administration of splenic extract in doses up to 20 c.c. daily is harmless, but the injection of such a large amount of fluid is rather uncomfortable to the patient.

In no case in which splenic extract alone was tested did it hold the tension at a lower level than did the usual therapy of eserine and pilocarpine. In two cases the tension rose as if no therapy at all were being given. That it did not definitely go up without the usual miotics in all cases may have some significance.

When splenic extract was used in combination with the usual therapy, the tension was in some cases lowered slightly and in others raised slightly.

In view of the erratic course of the tension of glaucomatous eyes under any therapy, it is doubtful whether the changes are of any significance.

From the results obtained in this admittedly small series of eight cases, it would seem that the value of splenic extract (40 percent) in the treatment of chronic simple glaucoma is extremely doubtful.

The patient's allergic state did not affect the result.

I wish to express my appreciation to Dr. Lawrence T. Post for the opportunity to do this work under his supervision.

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TREATMENT OF TRACHOMA WITH SULFANILAMIDE

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Through the efforts of Supt. Wm. Donner, Dr. J. G. Townsend, Director of Health, Dr. Polk Richards, Medical Director in Charge of Trachoma Activities, and the late Dr. F. I. Proctor, Consultant in Trachoma, a trachoma school was established in September, 1934, at Fort Apache, Arizona, for the purpose of isolating and treating all trachomatous school children on the Whitemoutain Apache Indian Reservation. Careful examination of all children of school age showed that approximately 50 percent had trachoma. These were segregated in the new boarding school to facilitate treatment and to reduce the incidence of exposure. Subsequent examinations of all school children on the Reservation were made at frequent intervals and all new cases were transferred to Fort Apache.

Trachoma on the Whitemoutain Apache Reservation differed in no essential way from trachoma as seen on other reservations. Considered according to MacCallan's classification, the majority of cases fell into stages IIa and IIb with a few in stages I and III. Clinical diagnosis was made on the basis of characteristic conjunctival changes combined with the presence of pannus as determined with the hand slitlamp. All cases showing suspicious conjunctival changes but no pannus were kept under observation at the trachoma school until a positive diagnosis could be made. Most of these, when examined with the biomicroscope, showed early trachomatous corneal changes. Four cases classed as suspected trachoma were seen at onset; in these incipient pannus developed during a 10-day observation period. Patients who did not develop pannus during an extended observation period were returned to their respective schools.

Although there was considerable difference in the intensity of the conjunctival reaction in the different cases under observation, the essential combination of follicular and papillary hypertrophy was always present. In none of the IIb cases were the trachoma follicles completely masked by the papillary hypertrophy. Some of the stage-III cases showed very extensive conjunctival scarring. The major variations, however, occurred in the severity and extent of the corneal disease. Approximately 5 percent of the children had complete pannus, but the majority of cases required the biomicroscope for the demonstration of pannus. In a group of 156 children, 39 percent showed limbal follicles or their cicatricial remains, Herbert's pits. There was no relationship between the apparent duration and severity of the conjunctival lesions and the corneal disease. Certain children who had been affected for less than two years showed complete pannus with numerous corneal scars or active ulceration, while others who had had the disease for 10 years or longer showed minimal pannus and little corneal activity. The punctate corneal lesions characteristic of trachomatous avascular keratitis (Busacca[1]) were found in all active cases but were not employed as a criterion for diagnosis, since they were also found in certain types of bacterial conjunctivitis. Their disappearance, however, proved to be a valuable indicator of corneal healing.

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The visual acuity of the group of trachomatous children when the school was started was below normal: 38 percent had an acuity of less than 20/20 and 1 percent had less than 20/50, while in the groups of nontrachomatous children only about 1 percent had an acuity of less than 20/20.

The treatment of trachoma during the five years of the school's existence varied considerably. During the first year all cases were treated alike with a 2-percent solution of silver nitrate, applied three times weekly to the conjunctiva of the everted lids by means of cotton applicators, followed by copious irrigation with boric acid in normal salt solution. On alternate days a solution of 2½-percent copper sulphate solution (prepared by diluting a stock solution of 10-percent copper sulphate in glycerine with water) was instilled into the conjunctival sac. An exception was made in cases showing abundant mature follicles. In these grattage was applied to the conjunctiva by means of moderate friction with gauze.

In the second and third years an attempt was made to treat the disease according to the type and severity of conjunctival pathology present. Patients who showed severe inflammation and discharge were treated with applications of 2-percent silver nitrate until the acute symptoms had subsided and were then given daily chaulmoogra oil massages. A cotton applicator dipped in the oil was used to massage vigorously the everted lids until a soapy lather had developed. This procedure was carried out daily until all follicles had disappeared and the conjunctiva had become smooth. After the lids had remained smooth for a short period the treatment was changed to the daily instillation of 2½-percent copper-sulphate solution. Those cases showing extensive vascularization or other corneal pathology were treated with quinine bisulphate, a 10-percent solution being applied to the conjunctiva of the everted lids thrice weekly and a 2-percent or 4-percent ointment being used, with light massage of the closed lids, on alternate days. Since chaulmoogra oil was expensive and become rancid quickly, a group of cases was treated similarly with mineral oil. The results were equally good, indicating that the efficacy of the treatment lay in the mechanical effect of the rubbing rather than in the oil itself. Mineral oil was thereafter used exclusively in this procedure during the fourth year.

In the fifth and last year, following the report of Loe,[2] all previous forms of treatment were abandoned and sulfanilamide was used exclusively. The drug was given by mouth in amounts of one-half grain per pound body weight daily in four divided doses during the day. Treatment was continued for a period of 21 days and the children were then checked for trachomatous activity. Those still active were given a second course of treatment.

Results of sulfanilamide therapy

Of the 167 children treated with sulfanilamide, the pathology in 125 became arrested within 30 days of the beginning of treatment. The remaining 42, in whom conjunctival and corneal activity was

TABLE 1

SULFANILAMIDE THERAPY

No. given sulfanilamide for three-week period	No. arrested 30 days after beginning of 1st course	% Arrested
167	125	75
No. given sulfanilamide for 2d three-week period	**No. arrested 30 days after beginning of 2d course**	
42	167	100

still present, were given a second course and, as a result, the disease became inactive (table 1). Definite improvement was seen consistently within 10 days of beginning therapy and was characterized by the fading, first of the papillary hypertrophy and second of the follicular hypertrophy. Corneal activity, when grossly evident, responded rapidly, but the punctate fluorescein-staining epithelial lesions disappeared slowly, sometimes not until a month or two after the activity in the lids appeared to be clinically arrested.

TABLE 2

DURATION OF TREATMENT OF 215 CASES ARRESTED WITHOUT SULFANILAMIDE

4 years	3 years	2 years	1 year
46	67	65	37

The effect of sulfanilamide therapy on early (stage I) trachoma was very striking. Frequently both conjunctiva and cornea returned to normal within the first 10 days. In advanced cases with extensive papillary hypertrophy, deep-lying follicles, and much corneal involvement, the effect was slower. Frequently a clearing of both conjunctiva and cornea continued for weeks after the drug had been discontinued.

Comparison of sulfanilamide treatment with previous forms of treatment

Sulfanilamide treatment appeared to be much more rapid and efficacious than the types of therapy previously employed. During the first four years of the life of the trachoma school the disease was arrested in 215 of 428 cases treated. As indicated in table 2 many of these cases had been treated throughout the entire four years, although the average length of time was about two-and-a-half years.

SUMMARY AND CONCLUSION

The different types of therapy employed at the Theodore Roosevelt Trachoma School at Fort Apache, Arizona, are discussed and the results obtained with sulfanilamide are compared with those from other forms of treatment. The disease in 125 out of 167 trachomatous children became clinically arrested in one three-week course of sulfanilamide; in the remainder it became arrested following a second similar course. Previous forms of treatment had required an average time of 2½ years to effect an arrest.

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OCULAR FACTORS IN POOR READERS IN THE SAINT LOUIS PUBLIC SCHOOLS*

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It is universally acknowledged that good eyes and ears are the most necessary sensory requirements for education, for through these organs almost all impressions are received and interpreted in the higher centers, and without such equipment the individual is severely handicapped and frequently does not progress at a normal rate.

The most necessary educational fundament is an ability to read well, and educators recognize that a good reading sense is a basic accomplishment for education. An individual without such a foundation is encumbered with a deficiency that he never overcomes, and those in whom it is lacking do poor work, generally, in all subjects.

Twenty years ago, reading was taught orally in order to teach pronunciation. One word at a time instead of a phrase was seen and pronounced, with the result that reading was learned so slowly that many pupils were unable to get their lessons. It is known now that oral reading is responsible for difficult reading, and we are justified in assuming that half the children who fail in school do so because they were improperly trained to read.

Reading is an activity that involves sensory and motor skills and that requires a delicate and complicated oculomotor adjustment all too familiar to the ophthalmologist. While, in an approach to ascertaining the causes for poor or difficult reading, it is desirable also to eliminate all physical or systemic factors that might have a bearing on the problem, it must be borne in mind that reading is done with the eyes, and it would seem that the first attack of the problem would be to discover any defects in the organs of sight.

In the early part of 1937, a survey was begun of certain classes of young children in the lower grades of the Saint Louis public schools with a view to establishing the factors relating to, and responsible for, their lack of scholastic progress.

The Department of Instruction wished to know whether the children's eyes or ears were at fault; whether there was insufficient mentality; or whether the teacher was responsible for these pupils' retardation.

In most cases intelligence tests had been made previously in the respective schools, and the teaching ability of the instructors had already been rated. Accordingly, an ophthalmologist and an otolaryngologist were engaged to examine such children and to make certain recommendations that would be followed up through the Department of School Hygiene and, it was hoped, carried through by the parents.

One of the new, centrally located schools was selected to accommodate this service of eye and ear examinations, and space with complete modern equipment was provided. A routine examination was made in each case, and included determination of the refractive error, external and internal ocular examination, and tests for color perception. Inquiry was always made in regard to blurring of sight and headaches. Letter and word reversals such as tar for rat, saw for was, or words

* Presented before the Saint Louis Ophthalmic Society, October, 1938.

seen wrongly in sequence, and so read, indicated tests for muscle imbalance and fusion, which were frequently done. The near point and accommodative ability were also investigated when required.

All determinations of the refractive error were made without cycloplegiacs. The value of cycloplegia is realized and it was felt that this should have been done in some of the cases which were seen, but it was specifically requested that no medication of any sort be used in public-school work. On the other hand, very accurate determinations of the refractive error can be made without such agents, particularly in the discovery of the lower astigmatic errors, by fogging.

The examination was made solely for the purpose of diagnosis, and no treatments were given. Parents, when they accompanied children, were told of the needs and encouraged to seek competent attention. If an ophthalmologist had been consulted previously, the pupil was told to return to him. When the services of an oculist could not be afforded, reference was made to the clinic closest to the family's residence. Never were the children referred to individual ophthalmologists. It was one of the aims of this service not to divert patients to sources for consultation or treatment, other than those to which they had previously applied.

The number of children who could be examined was very limited, only 15 being allowed to come from each school, and these were the very poorest readers. When the average daily attendance in the public schools of Saint Louis is considered (it is 102,000) this is a very small percentage of the entire school population. The visual acuity of all children in the schools is checked periodically by the school physician, and many students who have diminished visual acuity are eliminated thereby. Our examinations were not inclusive for this entire group but only for an exclusive number represented by poor readers and those who were not making satisfactory progress. Accordingly a great many came to us who had very keen sight but who did not read well. It was in such cases that errors in the lower ranges of astigmatism were discovered, and it was surprising what benefit could be derived from their correction.

It is especially true of school children that a considerable error of refraction can escape detection by the ordinary visual tests. A careful history will at times throw light upon the matter. Requirements of 6/6 or more can be satisfied readily by a child with high hyperopia, some astigmatism, a moderate amount of mixed astigmatism, or even low myopia. Eyes with such defects can, for the moment, sustain a concentrated effort, but cannot maintain that effort during a longer period of application to close work. Evidence from the teacher relating a history of the child's classroom peculiarities and behavior cannot be discarded. Good vision without symptoms of eyestrain does not preclude the inability to recognize letter and word forms correctly.

The demand for an excess of accommodation at the near point causes a child to lose his place while reading, and happens most frequently during the very short period of relaxation of the ciliary muscle when a jump is made from the end of one line to the beginning of the next. The result is blurring with increasing difficulty in reading as a lesson continues. Sometimes it happens that succeeding lines are jumped, or the gaze may center upon words several lines away, above or below. Confusion results also with the attempt and inability to name or copy similar characters correctly; such as, B and P, G and O, 8 and 3, and so on.

Instances such as the foregoing are not associated alone with the higher re-

fractive errors including astigmatism, but also with lesser ones, such as 0.5 diopter of astigmatism, especially in the horizontal meridians or in those a few degrees off the vertical or horizontal, or in the oblique.

At times the remote indications of eyestrain overshadow the ocular symptoms. Lack of concentration and interest, and failure in reading and allied subjects, indicate an immediate examination of the eyes. Many ophthalmologists feel that more disturbances originate from moderate defects of refraction which are difficult to establish, than from the higher degrees of error. Experience with the eyes of school children would lead me to agree.

Before a child enters upon the duties of school life, it is essential that parents and educators should have definite knowledge of his visual status, and no child should be admitted to studies until he has been subjected to a careful ocular examination. When possible, this should be done by a trained oculist at the time he enters kindergarten, and all disqualifying defects should be corrected by proper lenses or other means. Expert supervision is not always feasible, particularly in the larger cities where attendance in the schools amounts to many thousands daily. Under such circumstances visual tests are often necessarily made by teachers or general medical practitioners.

Such tests are of paramount importance to the parents who are thus acquainted for the first time with the existence of defects that may cause other plans to be laid for the child's future. When defects are corrected early, the child enters school life upon equal terms with his fellows with normal eyes.

Only too often unrecognized ocular defects have been responsible for apparent stupidity and retardation in pupils, and many a child has suffered punishment because of lack of progress in such instances.

There are undoubtedly many children in our schools who are in immediate need of ocular attention and who do not have it because such need has never been stressed. From the relatively small number of school children who have been examined, it would appear that much good can be accomplished through the recognition of ocular troubles and their correction, by following out the recommendations which are made.

Unfortunately there was no control of the child after advice had been given. It was always recommended that an oculist be consulted whenever the need for lenses or treatment presented itself, whether such services could be obtained privately or at a clinic. The big problem of incompetent refractionists and optometrists was always present. So many children had glasses entirely unsuited to them. There is always present the possible change in the amount and kind of refractive error, especially in the eyes of growing children; but no excuse exists for a decided change in measurement over a short space of time.

Certain results of the survey may be of interest. These, covering the period from February, 1937, to June 1, 1938, are tabulated below:

		Percent
Total number examined	1,109	
Vision less than 6/6 in one or both eyes	175	15.95
Refractive errors possibly responsible for poor reading	533	48.06
*Defects, other than refractive errors, contributing to poor reading	124	11.18

Classification of the refractive errors in all examined:

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*Phorias, tropias, nystagmus, post-inflammatory conditions, muscle paralyses, intraocular findings, and others.

		Percent
Hyperopia	643	57.98
Hyperopic astigmatism	240	21.64
Compound hyperopic astigmatism	162	14.60
Myopia	40	3.60
Myopic astigmatism	18	1.62
Compound myopic astigmatism	16	1.44
Mixed astigmatism	18	1.62
Emmetropia	6	0.54
Undetermined	6	0.54
Lids: Conjunctivitis simple	353	31.83
Folliculosis	55	4.90
Trachoma	4	0.36

While it is still too early to evaluate in a concise manner the benefits of this survey, it is gratifying to receive, from day to day, reports that indicate improvement in the work of a large number of pupils. Requests come in constantly from the schools for examinations and recommendations for those who were not included in the survey and who undoubtedly need advice. Unfortunately this cannot be done unless the ophthalmological service is extended to include all the pupils in all the schools.

Another side of the question, not relating to the child's welfare, is the cost of repeating a course. It has been determined that an expenditure of $20.00 is required to educate a child for one quarter of the school year. Every time a pupil fails his course, it costs this amount to enable him to repeat the quarter's work. Even after repeating he may not have passed it. But, if his physical faults are found out and discovered, and these are chiefly ocular, a very large sum of money will be saved the taxpayers, because the child will not need to waste time and effort.

The whole program has been very well received and there is a feeling that it should be a permanent addition to the work of the Department of School Hygiene. It is hoped that the future will see an enlarged and greatly augmented ophthalmological service in the Saint Louis public schools.

Addendum: Since this paper was read, the Division of Hygiene of the Saint Louis public schools has conducted a survey to determine the scholastic progress made by pupils for whom recommendations had been made regarding certain ocular or aural needs or defects, and in whom these recommendations had been fulfilled. This was done by questionnaires directed to the principals and teachers of a number of schools selected promiscuously in several and unrelated districts, and which would represent a true cross-section of the entire public-school system of Saint Louis.

Pupils examined between February 1, 1937, and June 1, 1938, were included in the survey and the progress was noted for the year following the examination and the correction of the various conditions.

		Percent
Number of questionnaires sent	314	
Pupils with whom contact could not be made (for various reasons)	27	
Number of questionnaires returned with requested information	287	
Pupils in whom ear conditions were corrected	58	20.2
Pupils in whom eye conditions were corrected	144	50.1
Pupils who made no progress	85	29.7
Pupils improved in reading ability after eye and ear conditions were corrected	202	70.2
Definite eye cases (of these)	143	70.7
Total number of reports for all types showing progress and no progress	287	
Eye cases improved	143	49.8

From this tabulation it may be concluded that progress was made in all studies, but chiefly in reading ability by 49.8 percent of the number of pupils examined, and by 70.7 percent of those who were definitely eye cases.

I wish to thank Dr. Henry J. Gerling, Superintendent of Instruction, and Dr. Joseph H. Humphrey, Director, Department of Hygiene, Saint Louis public schools, for their kindness and assistance in the survey.

Metropolitan Building.

KERATOMALACIA AND CYSTIC FIBROSIS OF THE PANCREAS*

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Chicago

The advances made in our knowledge of the deficiency diseases during the last few decades have made the subject of ever-increasing practical importance to all branches of medicine. In this regard, ophthalmology is no exception. Great credit is due the early clinical investigators who conceived the fundamental idea that certain diseased states were due to a lack in the diet, although at the time they were unable to identify the missing substance. Nevertheless, even without the benefit of chemistry, such conditions as scurvy, beri-beri, some forms of night-blindness, xerosis of the conjunctiva, and to some extent rickets were understood quite well. Great impetus has been given the subject during the past few decades by the splendid work of chemists and physiologists. They have made the subject more exact and have widened its scope tremendously, but anyone who becomes at all interested in the subject is sure to feel that much remains to be done. This is especially true in regard to the clinical and pathologic study of human beings who have vitamin-deficiency diseases. A number of excellent papers reporting the results of this form of investigation have appeared during the last few years, but many of them appeared in various journals on pediatrics and may not have come to the attention of ophthalmologists in general. It is the purpose of this paper to review somewhat briefly a few of the more recent articles in which the pathologic conditions found in vitamin-A deficiency have been reported. A case report will also be given which, at least in the enthusiastic opinion of the writer, seems to consolidate many of the facts brought out by this review.

Keratomalacia was known to be due to malnutrition long before any exact knowledge of vitamins existed. Gradually the relationship between it and vitamin A became established, but little was known concerning the changes in other tissues in the body produced by deficiency of this vitamin. When treated with cod-liver oil a few patients with keratomalacia recovered, but most of them died within a few days, apparently from pneumonia. Frequently the oral administration of cod-liver oil was ineffectual, and the oil could be recovered in the stools. For some reason it was not absorbed by the intestines. In time it became apparent that one of the characteristics of vitamin-A deficiency was a widespread change in the epithelial tissues of the body. At first it was believed that vitamin-A deficiency rendered epithelial tissues more susceptible to infection, but later, more exact study has shown that the process is really one of a keratinizing metaplasia of epithelium. This change occurs in certain glands as well as in surface mucous membrane.

Wilson and DuBois[1] in 1923 reported the case of an infant with keratomalacia in both eyes, both of which perforated. Inflammatory lesions were found in the lacrimal and salivary glands, and there were cell changes in the epithelial lining of the ducts of the submaxillary and parotid glands. The pancreas showed keratinization of the epithelium in certain ducts, and there were many large and small epithelial-lined cystic cavities,

*Read at the seventy-fifth annual meeting of the American Ophthalmological Society at Hot Springs, Virginia, June 5-7, 1939.

marked inflammatory changes, and extensive fibrosis. The lungs exhibited keratinization of the bronchial epithelium, marked peribronchitis, bronchiectatic cavities, abscesses, and interstitial emphysema. They believed that the pancreatic cysts and bronchiectasis were due to the mechanical effect of desquamated keratinized epithelium.

In 1930 Higgins and Mallory[2] reported a case of keratomalacia in which there was a congenital anomaly of the gallbladder associated with sclerosis of the pancreas and dilatation of the pancreatic ducts.

Blackfan and Wolbach[3] in 1933 gave a very interesting paper on the clinical and pathologic study of 13 patients with vitamin-A deficiency. The ages of these patients varied from 1 to 18 months; 11 of them were between 3 and 9 months of age. In 7 of the 13 the diagnosis was made histologically from tissues obtained at autopsy. In their series there were six patients with keratomalacia, and none of these had received any cod-liver oil. Extensive pancreatic lesions, consisting of dilatation of the ducts and acini by inspissated secretion, atrophy of acini, and fibrosis, were found in six cases in this group. These investigators were of the opinion that the keratinizing metaplasia was a repair phenomenon stimulated by atrophy of the original epithelium, and they pointed out the marked effect such a change would have on the functions of the involved glands. The frequent finding of bronchopneumonia, bronchitis, and bronchiectasis is easily explained by the fact that the ciliated epithelium is lost quite early and is replaced by a more keratinized type of epithelium. These observers also found that there was a great depletion of fat in all the fat-storage depots.

A consideration of these papers, in addition to the knowledge we already possessed, gives us the concept that the lack of vitamin A in an infant frequently gives rise to malnutrition, keratomalacia, and such changes in the lungs, in the lacrimal and salivary glands, and in the pancreas as were previously described. Apparently keratinizing metaplasia of the mucosa of the intestinal tract does not occur. It is quite obvious that if the changes in the pancreas are extensive enough to interfere with the function of the organ in the digestion of fats, a vicious circle will be established, in as much as vitamin A is fat soluble. This would appear to explain why so many patients with keratomalacia and severe vitamin-A deficiency fail to respond to dietary treatment. It is possible that intramuscular injection of cod-liver oil would be more effective, a method that has been used with apparently good results and without danger of fat embolism.

If it be true that pancreatic disease can be induced by a diet deficient in vitamin A, and that this disease in turn may cause an even greater lack of vitamin-A absorption, the question at once arises, Do other forms of pancreatic disease in which the fat-digestive function is defective cause avitaminosis? No evidence can be found that this occurs in adults, but in children the condition known as celiac disease does offer a wide field for study. In this disease there is an alimentary intolerance for fats, starches, and disaccharids, and bulky foul-smelling stools containing large amounts of split fats are the rule. We know of no reports of keratomalacia occurring in a child with celiac disease, but Anderson,[4] in studying the relation between cystic fibrosis of the pancreas and celiac disease, found some evidence of vitamin-A deficiency in 10 of 49 cases. Anderson believed that cystic fibrosis of the pancreas might be due to fetal vitamin-A deficiency, because the condition so

nearly resembled that described by Wilson and DuBois and by Blackfan and Wolbach.

CASE REPORT

J. S., a white male child, three months of age, was admitted to the Children's Memorial Hospital on July 21, 1938. The birth weight was 5 pounds 4 ounces, and the weight at the time of admission was 6 pounds 2 ounces. The patient had a twin brother who weighed 10 pounds on this date, and who appeared to be quite healthy. The mother had taken no milk nor cod-liver oil during pregnancy. Both children were breast fed for three weeks, then received evaporated and condensed milk. At six weeks of age and for the subsequent three weeks, cod-liver oil was administered, then plain viosterol, in doses of three drops daily. Both babies were fed alike, but J. S. did not gain. Excessive lacrimation of his right eye was observed from three weeks of age on, and five days before admission the cornea of the right eye became partially opaque. Another striking symptom was a loud laryngeal crow.

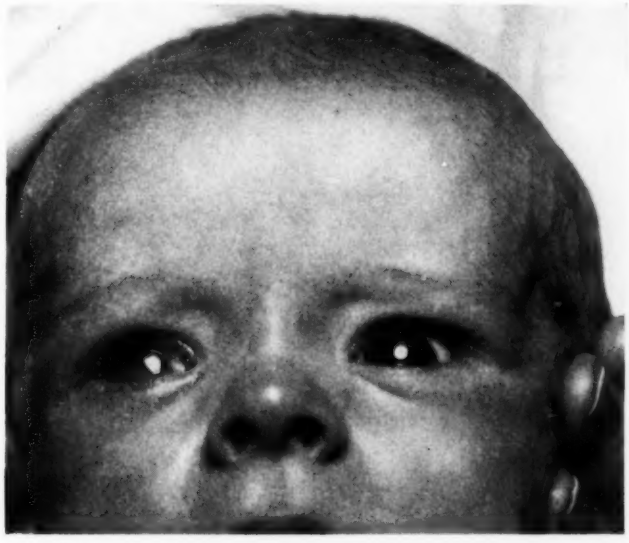

Fig. 2 (Gamble). The corneal opacity of the right eye clearing, but showing descemetocele, August 12, 1938.

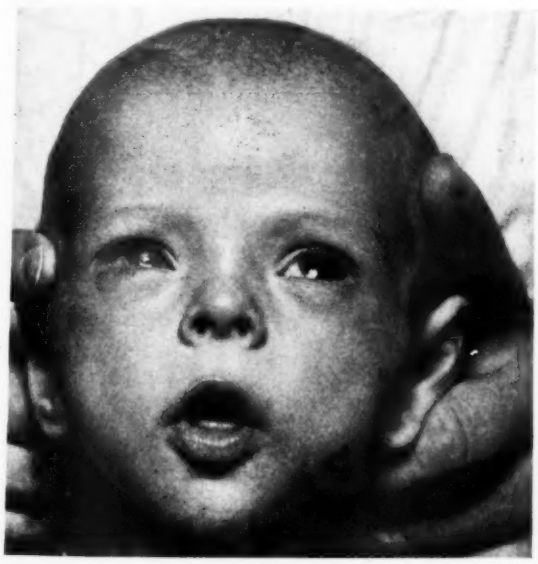

Fig. 1 (Gamble). Keratomalacia of the right eye before treatment, July 23, 1938.

General physical examination revealed a pale child with marked marasmus. The right eye had excessive lacrimal secretion, but the tears did not seem to moisten the bulbar conjunctiva, which was very dry in appearance. The cornea was quite opaque, and its surface was rough. The iris was barely visible. There was no ciliary injection nor blepharospasm. The cornea of the left eye was clear, but the bulbar conjunctiva was somewhat dry in appearance. There was no excessive lacrimation.

The stools were voluminous, soft, and yellow, resembling those seen in pancreatic deficiency. The usual laboratory tests of blood, urine, and the like were made and were found to

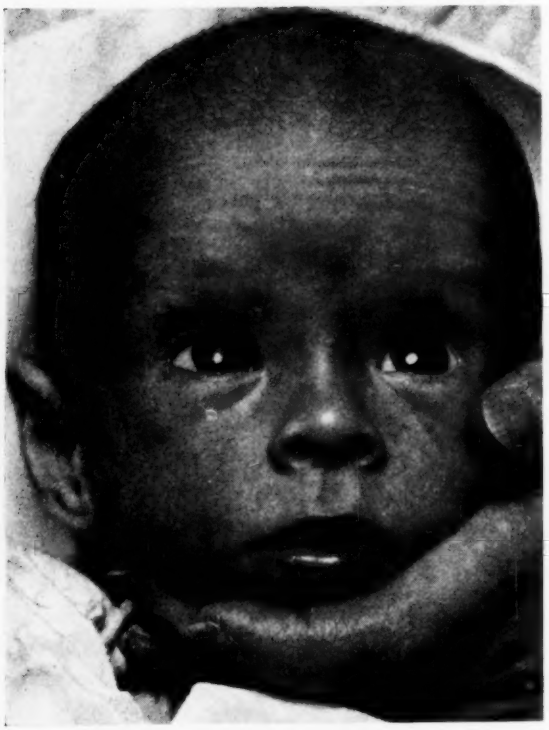

Fig. 3 (Gamble). Corneal opacity of the right eye clearer, descemetocele covered, September 23, 1938.

be without pathological significance.

A clinical diagnosis of marasmus, keratomalacia, and possible celiac disease was made.

In addition to proper diet, general treatment included oleum percomorphum 50 percent, rhyzomin B, betaxin, and several blood transfusions. Local treatment to the eyes included the instillation of atropine, mercury-bichloride ointment, mercurochrome, and oleum percomorphum. The use of oleum percomorphum locally was decided upon because it is a concentrated vitamin-A preparation containing not less than 60,000 A units per gram. Carotene in oil is a precursor of vitamin A, and is converted into vitamin A by the liver. For this reason it does not appear rational to use carotene for local treatment. The response to local treatment was most gratifying. The corneal lesion in the right eye immediately began to heal from the edge. In the center of the opacity the corneal tissue was cast off down to Descemet's membrane, so that a small, 2 mm., clear area appeared, but did not bulge. Within a short time this clear area was covered over. Eventually the opacity was only moderately opaque and involved less than half of the cornea. Its surface was smooth and glistening, and the iris and pupil could easily be seen. The dry appearance of the bulbar conjunctiva in each eye was not noticeable after several days of local treatment. On the other hand, the response to general treatment was quite unsatisfactory. On October 5th the patient developed considerable respiratory difficulty and died. The weight had fluctuated somewhat during the 10 weeks the baby was in the hospital, but at the time of death he

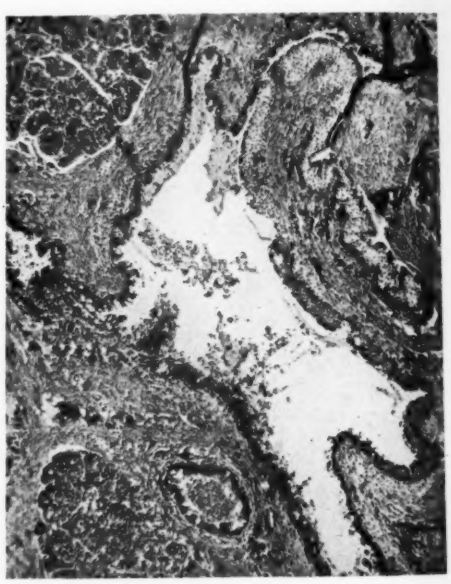

Fig. 4 (Gamble). Lacrimal gland of the right eye. Keratinization of epithelial lining of duct.

weighed 6 pounds 2 ounces, just as he did at the time of admission.

The postmortem examination was performed by Dr. W. Price Killingsworth. The gross examination did not reveal anything of special interest. There was thickening of the mucous membrane throughout the entire gastro-intestinal tract. The liver weighed 120 grams and showed cloudy swelling and fatty infiltration. The gallbladder, biliary passages, and pancreas grossly and on cut section showed no unusual findings. The genito-

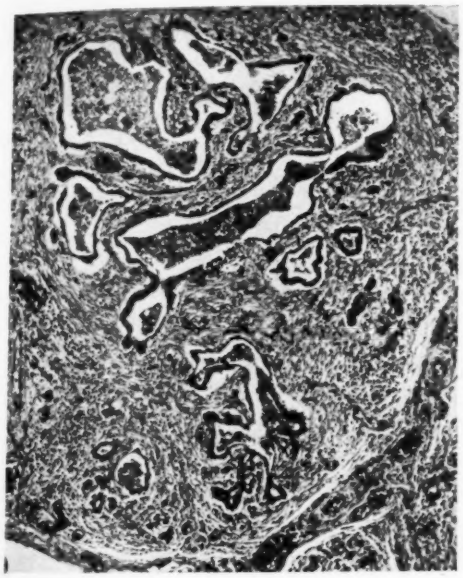

Fig. 5 (Gamble). Pancreas. Cystic dilatation of pancreatic ducts, lumina filled with cell débris and detritus. Marked fibrous-tissue proliferation everywhere; no recognizable pancreatic stroma.

urinary system was essentially normal. There was some emphysema in the lungs, but there was no evidence of any pneumonic exudate nor of bronchiectasis. However, practically the entire bronchial tree was plugged by a marked, widespread purulent exudate, and the bronchial mucosa appeared thicker than normal. The larynx was filled with a similar exudate.

The changes found on microscopic examination were of considerable interest. The following statements are copied from the complete postmortem record:

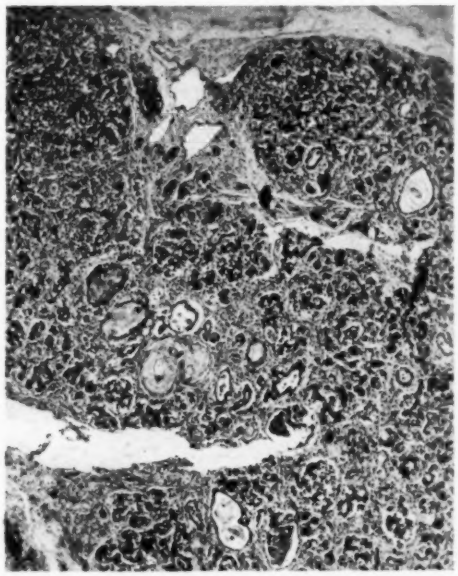

Fig. 6 (Gamble). Pancreas. Partially recognizable pancreatic glandular tissue; a few islets of Langerhans; dilatation of tubules with keratinlike material in lumen. Moderate wide-spread fibrosis.

Left lacrimal gland: No microscopic changes.

Right lacrimal gland: No microscopic change in the glandular structure, but there is moderate squamous-cell metaplasia (keratinization) of the lacrimal-duct epithelium.

Lung: There is atrophy, with total loss in places, and squamous-cell metaplasia of most of the bronchial epithelium. This metaplasia is moderate in nature. The larger bronchi are the sites of bronchiectasis, their walls as well as their lumina being invaded by a thick, purulent exudate composed of polymorphonuclear cells and cell débris.

Thymus: The thymus is the site of lymphoid hyperplasia and reticuloendothelial proliferation, characterized by

large, deep-staining giant cells similar to those of the Langhans type.

Skin: There is moderate keratinization of the squamous epithelium, but the most marked change is in the fatty tissue, which is fetal in nature, having no characteristics of fat except for an occasional small, clear fat cell. The nuclei are small and the cells minute, staining a dull pink. The fat stains show lack of the typical orange-yellow material present (depletion of fat-storage depots).

Trachea: Normal.

Kidney pelvis: Normal except for the previously described fetal-appearing fat.

Esophagus: Normal.

Small bowel: No microscopic change.

Spleen: Moderate lymphoid hyperplasia.

Liver: Moderate fatty and toxic changes.

Pancreas: (Multiple sections, H. and E., Mallory's Scharlach R and iron stains.) There is wide-spread marked fibrosis of the entire pancreas, with large and small cystic changes in the acinous portion of the gland. No squamous metaplasia is demonstrable in the acini nor in the smaller ducts. The larger acini, however, are partially filled with a blue-staining homogeneous material containing many leukocytes. Round-cell infiltration is wide-spread. The acini are reduced in number, as are the islets of Langerhans. The pancreatic duct shows moderate squamous metaplasia. The picture is that of chronic cystic fibrosis of the pancreas, a true pancreatic-deficiency disease.

Comment

This is a splendid example of primary pancreatic deficiency, giving the typical clinical and pathological appearance of an avitaminosis A. Due to the primary pancreatic disease, fats were poorly utilized and, despite adequate vitamin-A intake, they could not be utilized.

30 North Michigan Avenue.

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ALTERATIONS IN ANGIOSCOTOMAS FOLLOWING THE ORAL ADMINISTRATION OF BENZEDRINE SULPHATE*

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Although a considerable body of fact concerning the physiological and psychological effect of small doses of Benzedrine sulphate is available, few investigations have dealt with the specific effect of the drug on the special senses.

The purpose of the present investigation is to study the central visual fields before and after the administration of 10 mg. of Benzedrine sulphate and, if possible, to determine accurately the action time of small doses of the drug.

GENERAL METHOD

The method of angioscotometry was used to measure the central visual fields. The name "angioscotoma" is used to indicate a "defect of the visual field originating from the blind spot of Mariotte and related in form to the pattern of distribution of the retinal vessel tree." Following extended research it has been suggested that these shadows arose through modifications of the retinal peri-vascular space functions.[1, 2]

Technique of angioscotometry. The area of the scotoma is determined by a technique perfected by Evans[3] which permits a statement of the field defect in such form that the results may be qualitatively and quantitatively examined.

The Lloyd Stereocampimeter and Charts were used. Monocular fixation was employed throughout the experiment. The subject was comfortably seated and relaxed before the mapping was started. The disappearance of the test object was indicated by tapping. The diameter of the silver-white object used was 0.55 mm. and 0.56 mm. The blind spot of Mariotte was then outlined. Following this, the two main superior angioscotomas were plotted, care being exercised to move the object at right angles to the defect (figs. 1, 2, 3).

Subjects. One female and five male students free from known ocular defects, determined by ophthalmological examination, served as subjects. The age range, with one exception (53 years), was 18 to 26 years.

Procedure. The subjects rested for 10 to 15 minutes before any measurements were made. During the rest period they were acquainted with the apparatus and the manner of making the response; blood pressure was recorded. A further period of relaxation, five minutes, was allowed before the first map, called a control, was plotted.

The subject was given orally a 10-mg. tablet of Benzedrine sulphate and permitted to rest. Fifteen minutes later, after the blood pressure was recorded, the first experimental map was plotted. Successive maps were plotted at approximately 20-minute intervals for the next three to four hours, depending on the time during which the drug was effective.

Results. The results are presented in the following charts and tables. The maps clearly show that 10 mg. of Benzedrine

*From the Department of Ophthalmology, Long Island College Hospital.

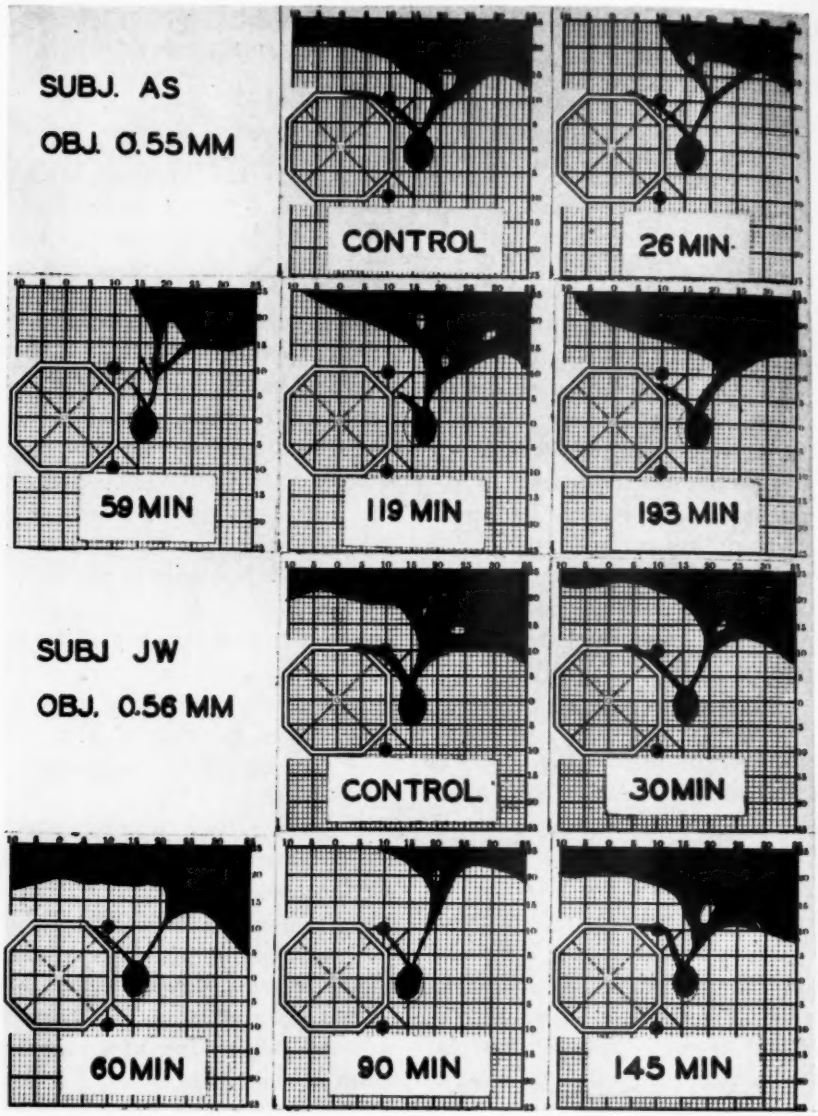

Fig. 1 (Rosenthal and Seitz). Maps of angioscotomata following administration of 10 mg. Benzedrine sulphate.

sulphate decreases the area of the angioscotomas. As shown in table 1 the effects of 10 mg. of Benzedrine were first noted by a decrease in the size of the temporal blind area and the nasal angioscotoma, 20 to 80 minutes after the administration of the drug. The average time at which the first change appeared was 34 minutes. The maximum effect occurred approximately one hour after the administration of the dose. The maps show a gradual return to normal after the peak effect. Maps corresponding to the control, resting maps, were obtained 100 to 235 minutes (mean, 156 minutes) after the Benzedrine sulphate had been ingested.

There were no marked nor consistent changes in the blood-pressure records, except in the case of subject 6. These cor-

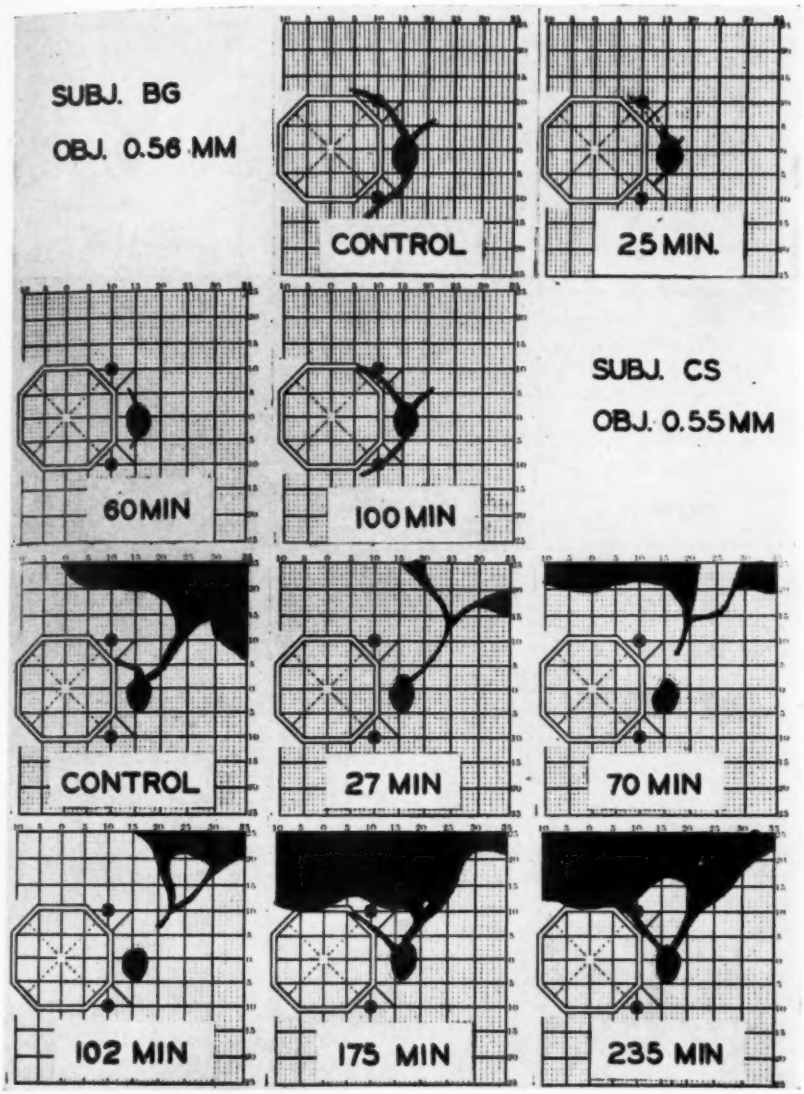

Fig. 2 (Rosenthal and Seitz). Maps of angioscotomata following administration of 10 mg. Benzedrine sulphate.

responded, in time, with the maximum effect on the angioscotoma. The same subject was also the only individual reporting marked subjective symptoms (tension which corresponded with the maximum changes in the angioscotoma and blood pressure).

In each case the blind area in square inches was measured with a planimeter.*

* An instrument by which the area of a plane surface, regular or irregular, may be measured.

These data (see table 2 for a typical record) were examined statistically by Fisher's[4] method for small correlated samples in order to establish the significance of the difference between the control and experimental maps. The results presented in table 3 show that the decrease in the size of the blind area is real, there being less than 1 possibility in 100 that the observed differences result from chance factors. It is to be noted

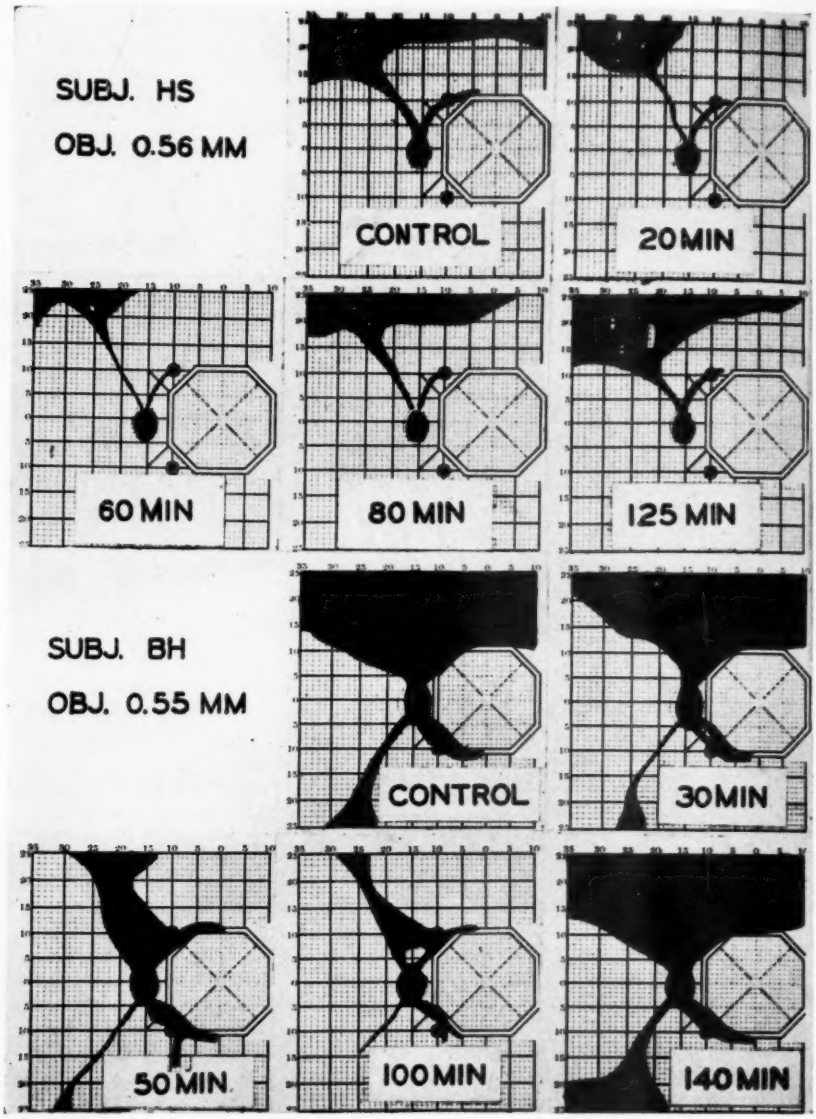

Fig. 3 (Rosenthal and Seitz). Maps of angioscotomata following administration of 10 mg. Benzedrine sulphate.

that at 156 minutes (mean value for six subjects) the difference between control and experimental data is insignificant.

Discussion

An important contribution of this study is to be found, it seems, in the sensitivity of this method of investigating the blind areas of the retina. Close inspection of the maps clearly shows the consistency with which the experimenter can map the blind areas. The sensitivity of this method for detecting small changes is shown by the fact that Barmach and Seitz[5] using similar doses of Benzedrine sulphate were unable to influence the "span of attention" though they did report a marked increase in the feeling of well-being at simulated altitudes of 16,000 feet.[9] It is also to be noted that appreciable vascular changes

TABLE 1

THE TIME AT WHICH CHANGES OCCURRED IN THE MAPS

Subject	1st Change minutes	Maximum Effect minutes	Return to Normal minutes
1	26	59	193
2	20	60	125
3	80	100	140
4	30	90	145
5	25	60	100
6	27	102	235

TABLE 2

A TYPICAL RECORD*

Time** minutes	Blood Pressure mm. Hg	Introspections	Blind Areas sq. ins.
Control	114/62	—	1.27
26	100/60	mild subj. symp.	0.63
59	104/60	sleepy	0.67
119	116/62	nervous	1.14
193	114/62	—	1.25

* Subject number 1, A. S.
** Records not indicated showed no change from the previous record.

are found usually only after doses as large as 20 mg.[7, 8]

Theoretical considerations of the mechanisms involved in changes in the angioscotoma are still in such a state of flux that no clear statement of the relation of Benzedrine sulphate to these changes is at the moment possible.

TABLE 3

DIFFERENCE BETWEEN CONTROL AND EXPERIMENTAL MAPS

Time	Mean Diff.	S.D.	t*
Control and			
1st Experiment	0.46	0.106	9.2
2d Experiment	0.54	0.265	13.5
3d Experiment	0.67	0.600	4.5
4th Experiment	0.03	0.420	0.24

* Underlined values—less than 1 chance in 100 that they occurred fortuitously.
Mean Diff. = Mean Difference
S.D. = Standard Deviation
t = Critical Ratio (relation between the standard deviation and the observed difference.)

CONCLUSIONS

The results of this experiment seem to indicate that Benzedrine sulphate administered in quantities (10 mg.) insufficient to bring about marked vascular (blood pressure) and subjective changes does, nevertheless, change the relative blind areas of the eye. It was also found that the action time of the drug was approximately 30 minutes with the maximum effect at about one hour, the entire effect lasting over a period of three hours.

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NEW APPARATUS FOR THE EXTRACTION OF CATARACT BY SUCTION*

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During the years 1930 and 1931, the "Revista Cubana de Oftalmología y Oto-Rino-Laringología," following my suggestion, carried out an investigation among the world's foremost eye specialists based upon the following question: "If you were afflicted with cataract, what method of operation for extraction would you prefer?"

The answers to this query proved to be of great interest. They began with my own, published in February, 1930, which read as follows: "The selection of the operator rather than the method of operation to be employed would be of primary interest to me. With this I wish to state that what is of greatest importance in a cataract operation is that the oculist possess a great amount of dexterity in some form of procedure. However, strictly answering the question directed to me, I will say that the intracapsular extraction with capsule forceps be tried first and if this fails that the operation be continued by the classical method. I would give preliminary tonometry all the importance that I have stressed in my publications; preliminary iridectomy a few weeks before the operation, if the tension is higher than normal, near the upper limit; simple extraction when the tension is normal and there is no contraindication; and, in any case, Liegard's suture—that is, a U-shaped suture with a corneal and an episcleral stitch."

It may be observed that at that time I did not consider phacoerisis. Everyone was engaged in energetic controversy regarding the two tendencies that were prominent in all congresses and publications and that provided the most interesting discussions in the field of ophthalmology; namely, the classical or extracapsular extraction of cataract and total or intracapsular extraction. Those of us who were trained to perform the classical operation, perfected by the use of the important factors of success, including preliminary tonometry, paralysis of the extrinsic ocular muscles by means of a retrobulbar injection of novocaine, fixation of the superior rectus, cleansing of the anterior chamber, and so forth, could not easily abandon a method of operation that had resulted in such brilliant service to humanity, allowing us to return sight to 97 percent of those blind from cataract, in order to seize upon new methods which even today are not practiced by more than 2 percent of all the oculists throughout the world.

Extracapsular extraction of cataract is an operation that presents two serious inconveniences: It requires the lapse of a long time to allow the cataract to ripen, and in more than 50 percent of the cases secondary cataract is produced. This, although easy to treat, occasionally results in some serious complications, and consistently, in spite of warnings to the patients, leads them to believe that the result from the first operation was not good, since a second and even a third operation becomes necessary in order to obtain success. The surgeon is exposed to conjectures and criticisms, for which reason it has been said that the secondary is a "telaraña que araña."

Total or intracapsular extraction offers the advantage of allowing the operation to take place months before it could have been performed by the classical method, thus saving the patient from

* Read before the Academia de Ciencias de la Habana, June 23, 1939.

blindness or at least from many days of incapacity for work. Frequently a better vision is obtained with this procedure; the secondary operation is avoided and there are less postoperative-inflammation phenomena. The objection against this method is that vitreous is frequently lost and that the operation is more difficult to perform.

When a surgeon contemplates operating on a patient suffering from cataract, he should always keep in mind that if the sick one knew the problem well, he or she would demand not only the return of the best possible vision but also the best vision with a minimum of risk.

Throughout the many years that I have been operating on cataracts this thought has constantly governed my conduct. It is not the same thing to operate in India, or more specifically in charity wards, as to practice surgery on a group of private patients. In the first instance, one works anonymously and has as an objective the attainment of practical experience; whereas in the second, one has to use experience previously accumulated and proceed with extreme caution in experimentation.

Figuratively speaking, we have witnessed the birth of a most important procedure in the method of total extraction. Colonel Smith, reporting extraordinary statistics of patients operated on for cataract, was able to attract attention to his method, but a few years of experimentation by others and critical evaluation were sufficient to have it pass into oblivion, leaving behind a mass of victims. Recently, Dr. Dutt of Sumpur Raj, India, has modified Smith's procedure and claims to be satisfied, but it is a little too early to pass judgment.

The method of electrocoagulation of Lopez Lacarrère failed at its birth. We were among the first to use the electrodiafacus but soon became convinced of its inefficiency for two reasons; namely, the difficulty in regulating the current (in spite of Lopez Lacarrère's opinion), and the practically constant rupturing of the capsule when the current passed through it, requiring the conversion of the operation into an extracapsular extraction.

Wright, with his method of extraction, by exercising pressure with his fingers, became famous but had few imitators. Only two methods of intracapsular extraction have survived; namely, extraction with the forceps and extraction by suction with the erisiphake. Forceps have been more frequently used than the vacuum cup because the procedure is simpler, and within the economic means of more ophthalmologists. We have performed extractions with the various forceps on the market—with those of Kalt, Verhoeff, Elschnig, and Arruga—and they all proved to be equally efficient, although I prefer the last named. Adherents to the method with forceps claim success in 60 to 70 percent of the cases. I have been able to obtain success in only 40 percent; for the remaining cases, due to rupture of the capsule, I had to resort to the classical method. With the forceps, vitreous humor is frequently lost, the lens luxated, and the capsule cannot be grasped when the process is in an advanced stage. Forceps are indicated in cases of soft cataract.

The use of the vacuum cup and vacuum in the extraction of cataract justly carries the name of phacoerisis of Barraquer, for, though he had predecessors, it is to this famous Spanish oculist that the method is due. Nevertheless, the Barraquer technique has not come into general use particularly because of the high cost of the vacuum generator and its complicated manipulation. These inconveniences have not been lessened to any considerable extent by the modifications made by Fisher of Chicago and Green of California.

In 1933 Dimitry presented his vacuum cup, consisting of an erisiphake which continues into a syringe where the vacuum is created. Rochon-Duvigneaud constructed a similar apparatus, and Arruga in Barcelona and Lijó Pavía in Buenos Aires modified this type of vacuum cup. All of them have the same disadvantage; namely, one cannot be confident that a sufficient amount of vacuum pressure will be produced, generally it remains too low. There is also the impossibility of recharging, if air should penetrate when the erisiphake is placed on the cataract.

With Lijó Pavía's third model a pressure of only 35 cm. of mercury can be obtained, and this has made it difficult for me to perform a clean extraction. On the other hand, this instrument is so bulky that it does not lend itself to the delicate movements required for phacoerisis. In Buenos Aires, Argañaraz has recently described an apparatus in which a glass syringe connected by a rubber tube to an erisiphake serves as a vacuum generator, but Professor Argañaraz has simplified his apparatus too much; with its use, just as with the vacuum cups of Dimitry, Arruga, and Pavía, the surgeon is in the dark as to the pressure he is using. Argañaraz estimates that with a suction pressure of 5, 10, or 15 c.c. a vacuum pressure of 30, 50, and 70 cm. of mercury can be obtained, but from the very first extraction I made with this apparatus I doubted these values, since sometimes the maximum pressure was insufficient to break the zonula and the application of the erisiphake had to be repeated, sometimes several times. According to my measurements, a maximum pressure of 15 c.c. provides only 55 cm. Hg. Furthermore, when the tube catch is released the vacuum pressure is lowered because of two factors; first, it is distributed in the rubber tube going from the valve to the erisiphake, and, second, because a little air leaks in at the moment of suction in the instant preceding the partial penetration of the lens into the vacuum cup. This happens with all vacuum apparatus, but with Argañaraz's model, as with the other syringe-vacuum-cup types, the oculist does not know the pressure he is using, and even supposing he knew the initial pressure, the simplicity of the apparatus will not allow him to increase it.

In view of these inconveniences in the use of suction apparatus which have so greatly hindered the general use of phacoerisis, I came to the conclusion that it was necessary to employ a new apparatus that would possess the following conditions: simplicity, precision, efficiency, and economy. With this in mind I made the following combination which fulfills these requisites (fig. 1).

A tank with a capacity of 80 c.c., that has a vacuum manometer screwed to its top, graduated from 0 to 76 cm. Hg, and a regulating valve in front.

This tank is connected on one side by a rubber tube to a standard suction pump, and on the other side to an ordinary erisiphake.

The manipulation of this set is quite simple. After the corneal section has been made, the nurse opens key 1 and closes key 2, being certain that the tank valve is closed tightly. Then, with two or three complete pumping movements, the air becomes rarefied in the tank, while the manometer marks the negative or vacuum pressure within.

The nurse stops the pumping 5 cm. in excess of the pressure desired, depending upon the type of cataract that is to be extracted, between 50 and 65 cm. Then, key 1 is closed.

When the vacuum cup has been placed over the cataract, the nurse is ordered to open key 2, thus firmly affixing the cataract to the vacuum cup.

Sometimes it happens, as it might with any vacuum-extraction apparatus,

that air enters between the vacuum cup and the cataract when key 2 is opened; but in such cases an additional stroke of the pump, with key 1 opened, will bring the manometer needle to the desired pressure, and the operation may be continued without removing the erisiphake from the anterior chamber.

If, in the case of an insufficiently dilated pupil or lack of experience on the part of the surgeon, the iris is caught in the vacuum cup, the nurse is ordered to give half a turn to the regulating valve in the tank, permitting the air to enter, lowering the pressure, and thus freeing the iris. Then the operation may be recommenced.

The surgeon who is in the habit of using Barraquer's or any other erisiphake may use it, of course, with this set.

To those who are not familiar with the erisiphake it is recommended that they read carefully the excellent publications on the subject by Barraquer, Fisher, Arruga, and Gomez Marquez, and the splendid book by Saint-Martin on "Capsular-lenticular-extraction" wherein all details are thoroughly considered.

Before closing I wish to point out certain factors which would lead more directly to success when performing the operation:

Extremely careful preparation of the patient. Good dilatation of the pupil with 2-percent atropine, instilled in the eye two hours before the operation, and two drops of adrenalin applied by subconjunctival injection a few minutes before the operation.

Anesthesia by instillation of 4-percent cocaine. Akinesia of the orbicularis, using Van Lint's method with 10 c.c. of 2-percent novocaine solution. Retrobulbar injection of 1 c.c. of a novocaine-adrenalin solution. Separation of the eyelids by means of two loops of silk thread in the upper lid and one in the lower lid. Fixation of the superior rectus in order to provide complete immobility of the eye. Preliminary corneoepiscleral suture, U-shaped, with a lateral knot in case the wound must be rapidly closed. This U-shaped suture is worth more than the 6 or 8 conjunctival sutures so much in vogue today, with which many oculists complicate the operation. Full half-cornea section. Peripheral or total iridectomy. Slow, very slow extraction.

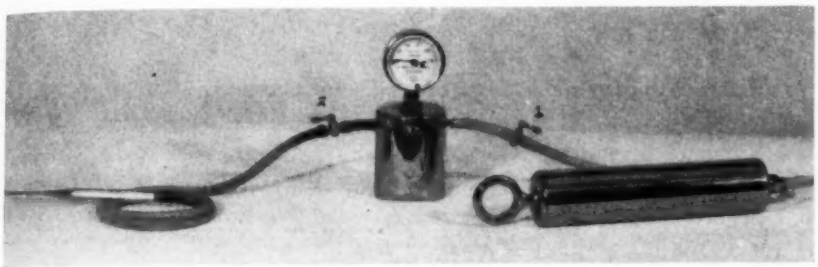

Fig. 1 (Ferrer). Apparatus for cataract extraction by suction.

Two more recommendations: The practice, advocated by some, of operating with the patient lying in his bed, should not be followed. The advantages of operating in an operating room cannot be counterbalanced by the danger of transferring the patient from the operating room to his bed. In 30 years of operating experience with cataracts I have never had an accident that could be charged to such transportation carefully made.

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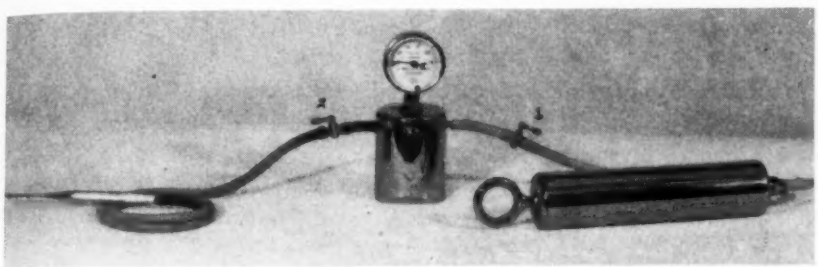

Fig. 1 (Ferrer). Apparatus for cataract extraction by suction.

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Finally, I again recommend preoperative tonometry, practiced routinely as a measure to be taken in preparing the patient, and I believe it even more necessary in connection with intracapsular extraction than with the classical method.

Preoperative iridectomy should be practiced some weeks in advance if the tension is above normal, and Elliot's trephining if the hypertension is very marked. Loss of vitreous humor and expulsive hemorrhage caused by decompression can thus be prevented.

In conclusion, I have not been among the first to accept Barraquer's phacoerisis as the procedure to be selected in the majority of cataract extractions, not in all cases; but I believe that with the use of my new apparatus the method of operating advocated by the genial Spanish doctor will be greatly facilitated.

Linea y L, Vedado.

TRANSMISSION OF SWIMMING-BATH CONJUNCTIVITIS TO MONKEYS*

L. A. JULIANELLE, PH.D.
Saint Louis

While obviously described by a numbe of ophthalmologists before him, it was Fehr[1] who established swimming-bath conjunctivitis as a distinct clinical entity. The chief manifestations of the disease** are now recognized as a conjunctival hypertrophy, follicular or papillary, often monocular; frequent ptosis of the upper lid with rugouslike transformation of the lower lid; usually swelling and tenderness of the preauricular glands; recovery within a few weeks or months without scarring of the conjunctiva or involvement of the cornea, although spontaneous recurrence is common; and, as Huntemüller and Paderstein[2] first demonstrated in this condition, the presence, during the early stages, of epithelial-cell inclusions indistinguishable from those occurring in trachoma and inclusion blennorrhea. It is understandable, therefore, that the combined early clinical appearance of swimming-bath conjunctivitis and the presence of epithelial inclusions create a temporary confusion in its differentiation from early trachoma.

That swimming-bath conjunctivitis may be communicated directly from eye to eye of man was illustrated almost simultaneously by Chaillous and Nida[3] and Kalt[4] when they observed transmission of the disease under accidental circumstances. Subsequently experimental infection in man was successfully accomplished by Hartmann[5] and Tassoni.[6] The disease, moreover, may be spread by direct or indirect contact from the genital tract, as recently reported by Thygeson and Mengert[7] and Mitzkevich,[8] both instances representing accidental inoculation from the vaginal tract to the eyes of attending gynecologists.

In their original communication, Huntemüller and Paderstein described the successful inoculation of a single monkey (*Macacus rhesus*) with material from a patient's eye. Passage of the conjunctivitis from the infected to a normal

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* From the Department of Ophthalmology, Washington University School of Medicine. Conducted under a grant from the Commonwealth Fund of New York.

** For an excellent general review of the subject, the monograph by V. Morax, *Les Conjunctivites folliculaires,* Paris, Masson et Cie, 1933, is especially recommended.

monkey, however, was not achieved. Somewhat later Morax and Nida[9] similarly infected a chimpanzee. In both instances the infection was mild, lasting six to seven weeks in the former case and only three weeks in the latter.

As a corollary to the study of trachoma[10] and inclusion blennorrhea[11] undertaken in this laboratory, it seemed desirable to learn more about the conditions governing transmission of swimming-bath conjunctivitis to monkeys in order to obtain a basis of comparison between the inclusion-bearing conjunctivitides. Accordingly, as patients consented to the operation for grattage, it became possible to collect sufficient material for studies on infectivity. While the experiments are not particularly numerous and, therefore, no emphasis can be laid on their statistical value, the results observed indicate clearly the principles involved.

Methods and conditions of study

Patients. The patients* supplying material for the work to be described were five in number, all white, varying in ages from 14 to 25 years, and presenting typical manifestations of the disease as well as epithelial-cell inclusions. In three patients the condition was unilateral, and in two it was bilateral. The condition was considered in each case to be acute at the time tissues were obtained. It may be important to add that in none of the patients studied did the swimming pool play any part in the evolution of infection.

Material. Material for study consisted of tissues suspended in veal infusion broth during grattage. This method has been described in the communications on trachoma.[10] The collected tissues were ground immediately with sterile sand until the particles appeared to be more or less completly distintegrated. The mixture was then centrifugated at a low rate of speed for 2 to 3 minutes in order to remove by sedimentation both the sand and the heavier fragments of tissue. The supernatant fluid was inoculated in monkeys either by swabbing the everted lids or by subconjunctival injection.[10, 11] When filtration was performed, the supernatant fluid was divided, a small portion being utilized for purposes of control and the remainder for filtration, as will be explained later. In each experiment, tissues from a single patient were studied.

Animals. The only animals employed were monkeys, species *Macacus rhesus.*

Observations and results

In the manner outlined above, it was possible to carry to completion five individual experiments with tissues altered only by grinding. Little time was lost between collection of material and inoculations, so that if the factor of possible inactivation of "virus" by prolonged standing was not eliminated entirely, it was at least reduced to a minimum. Subsequently, observations were made on the filter-passing capacity of the infectious agent, and an attempt was made to determine any cross immunological relationships existing between experimental trachoma and experimental swimming-bath conjunctivitis.

Infectivity of ground tissues for monkeys. In order to illustrate the conditions and results of the experiments performed with ground tissues, the complete data have been assembled in table 1. A study of the protocol reveals that in two of the five experiments performed (S.B. 2 and 3) none of the eight animals in-

* It is a pleasure to acknowledge the assistance and coöperation of Dr. L. T. Post in furnishing the patients and extending the facilities of the ophthalmological division of the Washington University Medical Clinics.

oculated were infected. The patients furnishing the tissues in the two experiments were in the fourteenth and tenth day of the disease (the latter during a recurrent attack) and their tissues contained inclusions, though scarce, to be sure, in patient S.B. 3. In the remaining three experiments (S.B. 1, 4, and 5), the tissues were derived from patients in the ninth, seventh, and fifteenth day of incubation periods were five and seven days, respectively, and the duration of disease about seven and three weeks. The conjunctival response in infected animals was essentially follicular and differed in no way from that seen in experimental trachoma and experimental inclusion blennorrhea, descriptions of which have been published in detail elsewhere.[10] The infection did not extend

TABLE 1

ASSEMBLED DATA ON TRANSMISSION OF SWIMMING-BATH CONJUNCTIVITIS TO MONKEYS

Experiment Number	Character of Disease in Patient			Number of monkeys		Incubation Period (days)	Duration of Infection	Severity of Infection
	Age	Inclusions	Character	Inoculated	Infected			
S B. 1	9 days	Numerous	Unilateral Severe	4	2	8 8	7 weeks 9 weeks	Mild Mild
S.B. 2	14 days	Moderate	Bilateral Moderate	4	0			
S.B. 3	10 days (recurrence)	Scarce	Bilateral Severe	4	0			
S.B. 4	7 days	Numerous	Unilateral Severe	4	4	7 7 10 10	3 months 3 months 8 weeks 7 weeks	Severe Moderate Mild Mild
S.B. 5	15 days	Moderate	Unilateral Severe	3	2	7 11	7 weeks 6 months	Mild Severe

the disease, respectively, and they also contained inclusion bodies. In these experiments, 11 animals were inoculated, 8 subsequently becoming infected. On the basis of differences in severity of infection in the five patients, it must be said the clinical conditions were not sufficiently divergent to explain the variations observed in infectivity for monkeys. The incubation period preceding the experimental disease varied from 7 to 11 days, while the actual infection lasted from seven weeks to six months. These figures compare favorably with those of Huntemüller and Paderstein and of Morax and Nida, in which the into the cornea; upon recovery, the conjunctiva was restored to its original normal appearance. In no instance was preauricular adenopathy observed.

In five of the infected animals, inclusion bodies were sought in scrape smears of the conjunctiva, during both the incubation and the early stage of the experimental disease. Inclusion bodies were found in only one preparation, on the second day of the disease, and only two were found on the entire slide. Since the number of animals examined is small, this observation may signify that inclusion bodies may be present only rarely and then in low frequency. It should be added

that both Huntemüller and Paderstein and Morax and Nida reported finding inclusions, the former on several occasions only after the disease was well established, the latter on a single day when follicles first appeared.

To summarize, then, 15 monkeys were inoculated with tissues from five patients with swimming-bath conjunctivitis. Of these animals, eight were infected with material from three patients after incubation periods of a week or more with a follicular conjunctivitis indistinguishable from experimental trachoma or experimental inclusion blennorrhea. Since neither the severity nor the age of the disease in the patients can account for the successful transmissions, it seems a reasonable assumption that the variation in infection in the different animals probably represents a variation in individual susceptibility. This thought is supported particularly by experiments S.B. 1 and 4, where two of four animals and one of three animals, respectively, escaped infection despite constant experimental conditions in all the monkeys.

Filterability of the infectious agent. Past experience with the viruses of trachoma and inclusion blennorrhea indicates that the infectious agents of these diseases are irregularly capable of filtration, and, when filtration is successful, there is an accompanying loss of infectivity during the process. As the opportunity presented itself, an effort was made to determine the filterability of the infectious agent of swimming-bath conjunctivitis.

Two such experiments were performed after preparing the tissues as described above. Filtration was attempted in both instances with collodion membranes prepared in accordance with the technique recommended by Elford.[12] Both membranes were found to have an average pore size of 0.65 μ. The suction applied was from 15 to 20 cm. of Hg, and filtration was accomplished within a few minutes. The integrity of the filters was tested with cultures of *B. prodigiosus* and by culture of the filtrates, and on both occasions these measures of control demonstrated faultless membranes. Both unfiltered and filtered materials were then inoculated into monkeys.

The two experiments conducted are summarized in table 2. The material tested for filterability was derived from the same tissues employed in experiments S.B. 4 and 5 (table 1). Analysis of the data discloses that in both cases sterile filtrates of the active tissues induced typical infection in monkeys. In the first experiment, one of four monkeys was infected as compared with four of four monkeys infected with unfiltered material; while in the second experiment there is a contrast of one infection in three inoculations of filtrate to two infections in three inoculations of unfiltered material. The period of incubation, character, duration, and severity of infection suggest no significant differences from the corresponding infections with unfiltered tissues. While the data are few and, therefore, inadequate for generalization, they nevertheless suggest that the infectious agent, while filterable, may suffer a loss in potency. Similarly, it is not possible to state whether the infectious agent of swimming-bath conjunctivitis is more regularly filterable than is that of trachoma or inclusion blennorrhea; it is the impression, however, from a broader experience with the latter two, that the agent of swimming-bath conjunctivitis would present comparable irregularities in filterability if an extended series of experiments was to be undertaken.

The indications are, therefore, that the infectious agent of this disease may on appropriate conditions pass through

collodion membranes with an average pore size measuring 0.65 μ, and in consequence it possibly loses a certain degree of its original activity.

Cross immunity between trachoma and swimming-bath conjunctivitis. The possible relationships between the infectious agent of trachoma, inclusion blennorrhea, and swimming-bath conjunctivitis have been discussed by a number of workers, some of whom even favor a common identity of all three agents.[10, 11] Experiments already reported from this laboratory,[11] while suggesting a lack of cross immunity between trachoma and inclusion blennorrhea, lose some of their significance because the virus of trachoma is an antigen of remarkably reduced capacity.[13] Additional observations[14] indicated that the viruses of inclusion blennorrhea and swimming-bath conjunctivitis are actually identical, so that it was anticipated that trachoma and swimming-bath conjunctivitis would not engender mutually reciprocal protection against infection. Nevertheless, in order to have experimental evidence on this possibility, data have been obtained on three animals. As explained elsewhere,[10] the technical difficulties involved in experiments of this kind are manifold, so that three animals form a more important series than their number suggests.

Monkeys number 19, 34, and 35 had previously recovered from experimental trachoma. After an interval of one month, number 19 was used in experiment S.B. 1 with successful transmission, while number 34 and number 35 were infected in experiment S.B. 4 after an interval of two and three months. At various periods up to four months following recovery from experimental swimming-bath conjunctivitis, all three animals were subsequently reinfected with the virus of trachoma. Thus the evidence in these instances is inescapable that recovery from experimental trachoma does not protect against experimental swimming-bath conjunctivitis, and, conversely, recovery from the latter condition affords no protection against reinfection by the former. The indications are, therefore, that the three inclusion conjunctivitides cannot be differentiated or identified on the basis of active

TABLE 2

FILTERABILITY OF THE INFECTIOUS AGENT OF SWIMMING-BATH CONJUNCTIVITIS

Experiment Number	Nature of Tissues	Number of Monkeys		Incubation Period (days)	Duration of Infection	Severity of Infection
		Inoculated	Infected			
S.B. 4-F	Unfiltered*	4	4	7	3 months	Severe
				7	3 months	Moderate
				10	8 weeks	Mild
				10	7 weeks	Mild
	Filtered**	4	1	15	6 months	Severe
S.B. 5-F	Unfiltered*	3	2	7	7 weeks	Mild
				11	6 months	Severe
	Filtered**	3	1	11	7 weeks	Mild

* Both experiments were done in parallel with Experiments S.B. 4 and S.B. 5, which are summarized in table 1.

** Filtration was accomplished with Elford membranes, the average pore diameter of which measured 0.65 μ.

immunity as determined at the present time.

Discussion

The expression swimming-bath conjunctivitis implies that the swimming pool is the source of infection and originates from the fact that this was actually the case when the disease was first established as an entity. It is an unfortunate name, however, since in the present day of better pool sanitation the typical signs and symptoms of the infection develop more frequently in the absence of this factor, as, indeed, the patients observed in this study illustrate. It would seem more correct, in rendering a diagnosis, to consider the disease itself and the virus associated with it rather than stipulate a possible means of dissemination as the decisive criterion. Furthermore, there seems little justification, as various authors have suggested in the past, to classify as swimming-bath conjunctivitis only those cases in which epithelial inclusions are found. As is true in trachoma and inclusion blennorrhea, inclusions are present only during the earlier or more "acute" phase of the disease; later they become scarce and, indeed, disappear even though the symptoms and discomfort may remain well marked. As pointed out in another communication,[11] inclusion blennorrhea is also overburdened with unfortunate confusion and nomenclature. It seems to the writer, therefore, that a new classification of the inclusion-bearing conjunctivitides is rapidly becoming necessary.

Previous experiments[14] recorded from this laboratory demonstrated that the viruses of inclusion blennorrhea and swimming-bath conjunctivitis are identical, and that their differences in clinical manifestations are referable solely to the age of the infected conjunctiva. Consequently, it is small wonder that the results of the present experiments should coincide so closely with those of the studies on inclusion blennorrhea: (1) an experimental infection characterized by a follicular conjunctivitis following an incubation period of a week or more, and lasting from a few weeks to several months without inducing any permanent change; (2) the infectious agent passes through collodion membranes (A.P.D., 0.65 μ), and as such is noncultivable on bacteriological media. As was true in the study on inclusion blennorrhea, the striking fact is the undifferentiated condition in monkeys resulting from inoculations with the virus of trachoma. The clinical appearance of the experimental infections, the filterability of the infectious agent, lack of immune response in recovered animals, indistinguishable inclusion bodies, and other characteristics, all suggest that the inclusion-bearing conjunctivitides of man are closely allied. It may be that in the infections in monkeys, the different diseases reach a common denominator and consequently fail to show the distinctions characteristic of their activity in man. Until, however, propagation of the respective viruses is successful, or more effective methods than those attempted in this laboratory make possible an antigenic analysis of the different viruses, it seems unlikely that a further differentiation or identification of the infectious agents will be satisfactorily achieved.

The differences observed in man are: (1) greater chronicity, (2) invasion of the cornea, and (3) cicatrization, all of which accompany trachomatous infection. The one difference on the part of inclusion blennorrhea and swimming-bath conjunctivitis is their ability to cause mild and transient infection of the genital tract. On an evolutionary basis, however, these distinctions may be interpreted plausibly in terms of greater virulence and more highly specialized

activity of the trachomatous virus. As long as experimental information is lacking, however, it seems an idle pastime to pursue a detailed discussion on the interrelationship of these viruses.

Summary and conclusions

1. Swimming-bath conjunctivitis may be transmitted experimentally to monkeys (*M. rhesus*). 2. The experimental infection appears as a follicular conjunctivitis following an incubation period of a week or more, and it may last for several months. 3. The experimental disease is indistinguishable from experimental trachoma and experimental inclusion blennorrhea in the same animal. 4. The infectious agent of swimming-bath conjunctivitis is filterable under appropriate conditions through collodion membranes measuring 0.65 μ A.P.D. 5. Since bacteriologically sterile filtrates of the human tissues retain their specific infectivity, the infectious agent is considered to be a virus. 6. No evidence was obtained of the existence of mutually protective immunity between experimental trachoma and experimental swimming-bath conjunctivitis. 7. The interrelationships of the inclusion-bearing diseases of the conjunctiva are discussed in brief.

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NOTES, CASES, INSTRUMENTS

MODIFICATION OF THE WORTH FOUR-DOT TEST*

CONRAD BERENS, M.D.
New York

An excellent test for determining the presence of single binocular vision and for ascertaining the presence of diplopia, suppression, or normal binocular vision at six meters has been devised by Claude Worth.[1] Because of the difficulties encountered in using the test in examining young children, a modification of the Worth four-dot test is described.

The apparatus used by Worth consists of a light tight box with four round apertures arranged in the form of a diamond. The lower aperture transmits white light,

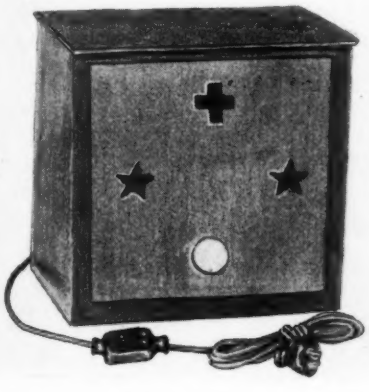

Fig. 1 (Berens). Modification of the Worth-Hardy four-dot test for use at 6 meters.

the upper aperture a red light, and the two middle apertures a green light. Special spectacles with one red and one green glass are provided, which permit one eye to see the red light and the other eye to see the green light while both eyes see the white light. The test has been developed for use at the near point by Hardy,[2] utilizing a large flash light to transmit light through four smaller dots.

Fig. 2 (Berens). Modification of the Worth-Hardy four-dot test for use at 25 cm.

Because of the difficulties encountered by young children in describing what they saw, the Worth test has been modified by using green stars in place of the green dots and a red cross in place of the red ball, the lower dot remaining as a round white dot.** The test as modified has been applied both to the six-meter (fig. 1) and 25-cm. test (fig. 2). The green glass is placed before the left eye and the red glass before the right eye. If the patient sees only the red cross above the circle below (which appears quite red), he is using the right eye only. If he sees three characters one white or greenish white and two green, he is using the left eye alone. If, however, he sees four characters—one red and two green and the white ball below (which may become

* Aided by a grant from the Ophthalmological Foundation, Inc.

** Made by Clairmont Nichols, New York City.

reddish white, greenish white, or a gray), both eyes are being used and the patient has some binocular vision. If five characters are seen, the patient has diplopia.

The accuracy of the test may be checked by the use of a five-degree or six-degree prism held base up over one eye or by reversing the spectacle and placing the green glass before the right eye.

35 East Seventieth Street.

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ORBITAL CELLULITIS SIMULATING ACUTE DACRYOCYSTITIS

GUERDAN HARDY, M.D.
Saint Louis

H. H., a girl, 10 years old, entered Saint Louis Children's Hospital on October 24, 1938. On October 20th she had complained of pain in the left eye and aching of the teeth. The following day the left upper eyelid began to swell and the left lower lid was bluish. During the next two days she had a bloody discharge from the left nostril and some postnasal secretion. Her temperature had varied between 101° and 104°F.

Three weeks before the onset of this illness she had what was called nasal catarrh. When five years old she had supposedly had a fractured nose and at six years her tonsils and adenoids were removed. There had been no preceding eye disease.

At examination the left conjunctiva was slightly reddened. The lid was edematous and the swelling extended over the bridge of the nose. No pus was expressed from the tear sac. The tissue over the sac was indurated, red, swollen, and tender. There was no proptosis and no limitation of motion of the eyeball. The white blood count was 24,000 cells.

The nasal mucosa was slightly injected and the left turbinates were swollen. Considerable mucopus was noted on the turbinates and in the meatuses on the left side. A bloody, mucopurulent, postnasal discharge was present.

A sinus X-ray film (Water's position) showed a completely opaque left antrum and soft tumefaction of the face.

Tentative diagnosis: acute dacryocystitis, left.

Deep X-ray treatment was advised in order better to localize the infection. This was to be followed by incision and drainage. This procedure plus hot wet packs was followed, and on October 28th Dr. James Bryan incised the skin over the sac. Some thick yellowish pus escaped. Roughened bone could be felt at the base of the wound but because of the edema the exact site of the rough bone could not be determined.

During the next four days the swelling subsided and on November 1st the left antrum was irrigated and a large amount of pus removed. The edema continued to decrease and a week later the antrum was again irrigated and a small amount of pus removed.

Cultures from the pus in the antrum showed hemolytic staphylococcus aureus and anerobic staphylococcus aureus.

The patient was discharged on November 10th and returned to the clinic. Healing was slow and removal of granulation tissue and curettement of the skin

edges were necessary before the wound closed.

On November 26th the left tear sac was irrigated with normal saline solution and it was found that the fluid passed into the nose readily.

A month later several small bonelike fragments were noted presenting at the labial-gingival junction just above the left upper bicuspid tooth. Another X-ray picture was made, which showed the deciduous incisor eroded by the permanent incisor. Following removal of this tissue healing was complete.

Comment. The clinical picture was confusing and the diagnosis was not well established at first. A purulent ethmoiditis could have produced the pathology. It is possible that the entire infection might have been of dental origin. I believe a dacryocystitis can be ruled out. In my opinion, an ethmoiditis was the primary infection and the dental pathology coincidental.

The major points against the condition arising from an infected tear sac were as follows: 1. There was no history of a preceding obstruction or infection in the lacrimal apparatus. Neither had there been a conjunctivitis. 2. Acute dacryocystitis is generally secondary to chronic inflammation. This apparently had not been present. 3. While pressure over the tear sac elicited pain there was no return of purulent material through the puncta.

Favoring a cellulitis of sinus origin were the presence of pus in the nose and the X-ray evidence. Against the diagnosis, however, were the absence of proptosis and the free movement of the eyeball.

Following is an anatomical explanation for this clinical picture. The palpebral fascia occupies the space between the tarsi and the margins of the orbit. Peripherally, it is attached to the orbital margin except at the medial angle where it is attached to the crista lacrimalis. Here it lies posterior to the medial palpebral ligament and the lacrimal sac.

The outer surface of the ethmoid labyrinth constitutes the medial orbital

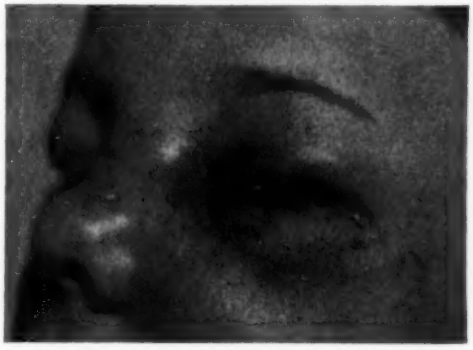

Fig. 1 (Hardy). Orbital cellulitis simulating acute dacryocystitis.

wall. The posterior two thirds of this wall is made by the os planum. The anterior one third is made by the lacrimal bone. The anterior ethmoidal cells are, therefore, in close relationship with the lacrimal sac and the lacrimal bone.

From a consideration of the attachment of the palpebral fascia to the crista lacrimalis and the relationship of the anterior ethmoidal cells to the lacrimal bone and sac, it is quite evident that pus could find its way from the sinus and appear anteriorly, giving the clinical picture described.

Humboldt Building.

THE TREATMENT OF HETEROPHORIA

DAVID W. WELLS, M.D.
Boston

On April 15, 1939, the following reply postal was sent to 1,350 holders of the American Board Certificate:

CHART I

TREATMENT OF HETEROPHORIA AND RESULTS

		Relief of Symptoms
1350	Inquiries to holders of Certificate of American Board	
461	Replies	
48	Do not treat Heterophoria, 1 "a lot of Bunk"	
5	Gave data on Hetero*tropia*	
408	Replies tabulated	
10	Prism exercises at home only, no other treatment	6 "?" 1 "most" 1 "100%" 2 average "70%"
3	Prism exercises at office only, no other treatment	1 "most" 1 "25%" 1 "80%"
10	Prism exercises at office and home only, no other treatment	4 "?" 6 average "79%"
21	Stereoscopic charts alone	5 "?" 1 "most" 1 "high" 1 "100%" 13 average "60%"
72	Stereoscopic charts and prism exercises only	34 "?" 1 "many" 1 "none" 36 average "64%"
323	Stereoscopic charts with or without other treatment	105 "?" 17 "most" 6 "good" 1 "few" 2 "none" 7 "100%" 183 average "64%"
131	Stereoscopic photos with dots or dashes to ensure fusion	
74	Wells method (decentration of spheres) and other treatment	
112	Controlled reading and other treatment	
14	Build up general health and other treatment	
3	Psychological (?) treatment and other treatment	
26	Refer to technician or orthoptic clinic	
9	Distance to near, white-headed pin	
61	Synoptophore and other treatment	
93	Rotoscope and other treatment	
72	Stereo-Orthopter and other treatment	
2	Metronoscope and other treatment	
2	Amblyoscope and other treatment	
2	Pugh orthoptoscope and other treatment	
1	Chiroscope and other treatment	
1	Kratometer and other treatment	

"In treating *heterophoria,* not *heterotropia,* I have been so well satisfied with the method which I have advocated and practiced for many years, that I have neglected to keep informed on what others are doing.

"I am therefore asking the holders of the American Board Certificate to answer a few questions.

"A summary of the information received will be sent to all those who participate."

Reply Card:

"Besides the use of prisms incorporated in the prescription, and surgery, what other treatment do you give for relief of heterophoria?

Prism exercises at home? In the office?

Stereographs with dots or dashes to insure fusion?

Stereoscopic charts graded from easy to difficult?

Stereoscopic decentration of spheres? (Wells method)

Synoptophore?

Rotoscope?

Stereo-orthopter?

Controlled reading?

In what percentage do you relieve symptoms?

A more extensive report will be appreciated."

By July 15th (three months), 461 replies had been received. Forty-eight of these do not treat heterophoria and five gave data for hetero*tropia.* This leaves 408 available for tabulation (chart 1).

In looking over these replies, the most striking item is the prominence of stereoscopy: 323 use hand stereoscopes or telebinocular with or without other treatment. The synoptophore, rotoscope, and stereo-orthopter, all stereoscopic, are quite popular. Only 23 rely on prism exercises at home or in the office and one uses the kratometer. Prism exercises were the almost universal treatment for hetero*phoria* 40 years ago; and the stereoscope principal—amblyoscope, fusion tubes, and so forth was advised for hetero*tropia*.

The percentage of "relief of symptoms" under different treatments is probably of little value in determining which is the best. A few of those replying have added very complete details and the estimated results have evidently been carefully made, while the others, as noted on the tabulation—"Majority, Many, Approximately, Don't Know, Good Results, Not Satisfied," and others—are evidently off hand but enthusiastic and high, especially the 100 percenters. Each method has at least one advocate who relieves 100 percent.

A comparison might be made between those who use prism exercises *alone* and those who use stereoscopic exercises *alone*.

23 use prism exercises *alone*.
10 replied ?.
1 replied Most.
1 replied 100 percent.
1 replied 25 percent.
7 averaged 79 percent.

21 use stereoscopic charts *alone*.
5 replied ?.
1 replied Most.
1 replied 100 percent.
13 averaged 60 percent.

No one seems to have *checked a number of consecutive cases* to determine the

CHART 2

WELLS SCHEDULE FOR REPORTING HETEROPHORIA CASES

Case No.	Symptoms H=Headache P=Pain in Eyes V=Vertigo C=Confusion	Exophoria				Duction				Fusion Faculty	No. Treats.	Symptoms C=Cured >=relieved not>	Phoria				Duction				% Loss after 6 mos.	Remarks
		Phorom.		Cover.		Revolving Pr.		Loose Pr.	Stereo.				Phorom.		Cover.		Revolving Pr.		Loose Pr.	Stereo.		
		D	N	D	N	Ad.	Ab.	Ad.	"One"				D	N	D	N	Ad.	Ab.	Ad.	"One"		

number of successes and failures. In 1917 the author presented a schedule for reporting the results of treatment, but so far as is known no one but himself has ever used it. At the Montreal meeting of the Academy in 1924, the result of plotting 236 cases on this schedule was given (chart 2).

Exophoria at distance— 155 cases.

70 cases or 45 percent symptoms cured.

52 cases or 34 percent symptoms relieved but not cured.

14 cases or 9 percent symptoms not relieved.

9 cases or 12 percent result not stated or treatment stopped—record incomplete.

Assuming that these were not relieved, it would make the number of failures 33 or 21 percent.

Cured or relieved 122 or 79 percent.

Insufficiency of Convergence— 81 cases.

36 cases or 44 percent symptoms cured.

34 cases or 42 percent symptoms relieved.

7 cases or 8 percent symptoms not relieved.

4 cases or 6 percent result not stated or treatment stopped—record incomplete.

Assuming that these were not relieved, it would make the number of failures 11 or 14 percent.

Cured or relieved 70 or 86 percent.

The question of whether some other method is superior to the one advocated in "The stereoscope in ophthalmology," will never be decided until the users of other methods will take the trouble to go over their cases and really *tabulate the results.*

Hotel Westminster, Copley Square.

GLASSES FOR THE COLOR-BLIND MOTORIST*

BRITTAIN FORD PAYNE, M.D.
New York

Lenses with upper segments of dark-red glass** have proved valuable to a number of color-blind motorists. The lower part of each lens is of ordinary crown glass but correction may be ground on both.

The lenses are composed of two separate pieces of glass. The upper one fourth is semilunar in shape and composed of red glass as near the shade of a "stop-light" as possible. The lower three fourths is of ordinary crown glass. The coefficients of expansion for the two types of glass are such that fusion is not practical but this does not detract from the usefulness of the lenses.

Fig. 1 (Payne). Glasses with upper segments of red glass for the color-blind person.

The glasses work by filtering out the "green light." The "change light" and the "red light" are perceived by the driver and he knows to stop. In other words, when a light is seen through the red segment he knows it is to "stop" or "change

* Presented before the Section of Ophthalmology, New York Academy of Medicine, May 15, 1939.

** Made by E. B. Meyrowitz, Inc., New York.

to stop or go." When no light or a faint shadow is seen it is safe to drive ahead. This device works equally well for the noncolor-blind person. All types of color-blindness react in the same way with the glasses. The green light disappears when observed through the upper segment, but the red and yellow lights are perceived.

A similar spectacle was described by Chapman* in 1933. He used red-free filter or glass for the upper segment. This gives a dark image for red and permits yellow and green to be perceived as bright lights.

The advantage of red glass over "red-free" glass in the upper segment is evident. When the color-blind driver sees a light through the red glass he knows he must stop or that the light is changing. The "fade-out" for red in the "red-free" segment is confusing.

With safety at a premium on our streets and highways it is thought that this simple device will be of some value to the color-blind driver.

896 Madison Avenue.

THE TREATMENT OF CHRONIC BLEPHARITIS WITH A MODIFIED KNAPP ROLLER FORCEPS, AND A ONE-PERCENT ALCOHOLIC SOLUTION OF GENTIAN VIOLET

WILLIAM BROWN DOHERTY, M.D.
New York

Probably there is nothing so discouraging to the ophthalmologist, and certainly to the patient, as cases of blepharitis that do not seem to respond to treatment. The secondary chronic picture characterized by numerous internal hordeola, multiple chalazia, infarcts of the meibomian glands, redness, thickness, and distortion of the lid margins is a most discouraging sight. Such pathology tests the therapeutic skill and patience of the ophthalmologist to the utmost. It is in these types of cases that we think a modification of the Knapp roller forceps might be useful in connection with a 1-percent alcoholic solution of gentian violet.

The rollers, unlike the grooved Knapp forceps, are smooth, so that instead of exerting a crushing effect and damage to the skin and conjunctiva, they exert more pressure and expulsive force on the retention secretions in the margins of the lids. When using these forceps in severe cases the lid margins should be locally anesthetized with novocaine, and thickened areas should be gently opened with a cataract knife through the lid margin; then the rollers of the forceps are placed on the upper and under surfaces of the lids and the contents of the retention cysts expressed. When the lid pathology is associated with multiple chalazia, these should first be removed in the ordinary way, but the internal and external hordeola are nearly always expressed by the instrument. Following such expression the lid margins are painted with a 1-percent alcoholic solution of gentian violet. I wish very strongly to approve and recommend this remedy in the treatment of all cases of stubborn chronic blepharitis, but I do not wish to imply that this agent should be used without first securing a thorough laboratory and systemic examination in order to determine the etiology of each individual case, but I am sure it is a valuable adjunct in any ophthalmologist's pharmacopeia in cases of resistant blepharitis.

The aqueous solution should not be used as it has a tendency to run, and there is more danger of the medicament's getting into the conjunctival sac. This alco-

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*Chapman, V. A. Safety spectacles for the color blind. Trans. Sect. Ophth., Amer. Med. Assoc., 1933, p. 301.

holic solution should be used in connection with sterile liquid vaseline, as a dryness of the lid margins will be produced when this treatment is continued over a long period of time. If, after the lids have been treated for several days with the gentian-violet solution, the clinical picture suggests slight dryness of the lid margins with gray flaky scales resembling dandruff, sterile liquid vaseline in the form of eyedrops should be substituted.

In two cases of folliculitis of the eyelashes secondary to a chronic sycosis vulgaris of the face, the pathology cleared up after treatment for a number of weeks in spite of the unusual chronicity of this affliction. In these cases the lashes must be extracted first. This is quickly accomplished, for the filament with its loosely adherent root sheath is easily removed because of the deep-seated pustules. The value of these forceps was demonstrated in one case of leptothrix of the upper canaliculus when the concretions were expressed after two attempts, one week apart, and there was no recurrence in four months. I used neither systemic nor local medication; merely expression with the roller forceps.

Fig. 1 (Doherty). Modified Knapp's roller forceps.

150 West Fifty-fifth Street.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

February 21, 1939

Dr. Edwin B. Goodall, *presiding*

The fundus oculi in essential hypertension before and after splanchnic sympathectomy

Dr. F. Bruce Fralick of Ann Arbor, Michigan, read a very interesting paper on the above subject. Dr. Fralick felt that the fundus changes seen in essential hypertension were best grouped according to the classification of Keith and Wagener as follows: Group I, slight increase in blood pressure becoming normal with rest and showing mild retinal arteriosclerosis. Group II, moderate to severe hypertension associated with moderate to marked retinal arteriosclerosis accompanied by venous thrombosis or arteriosclerotic retinitis. This group comprises those cases of a relatively benign type of hypertension with a tendency, after several years, to result in cardiac failure, cerebral vascular accidents, and, rarely, in terminal renal insufficiency. Group III, moderate to severe hypertension accompanied by angiospasm of the retinal arterioles with or without angiospastic retinitis, and without edema of the optic disc. This is definitely a progressive type of hypertension of potentially malignant character. Here 60 percent or more of the affected individuals will die within four years after the first observatioon of definite angiospastic lesions in the retina. Group IV, severe hypertension associated with angiospastic retinitis and edema of the optic disc, including the cases that formerly were said to show "albuminuric retinitis." This group comprises the most rapidly progressive and most uniformly fatal type of essential hypertension, and is classified by some as a malignant or fulminating hypertension.

It is also recognized that another group of cases is seen in which the fundi remain normal for many years, even though there has been a known hypertension of considerable degree over a long period. This is due to the fact that essential hypertension is a generalized disease of the peripheral arterial system characterized by patchy arteriosclerosis and arteriolar spasm, thus occasionally sparing the eyegrounds from the functional and organic changes usually seen.

For the purpose of this study 229 patients who had had splanchnicectomy for essential hypertension were selected. These patients had been examined pre- and postoperatively as to the fundus findings, blood-pressure readings, and kidney-function tests with a careful evaluation of subjective symptoms and degree of incapacitation. The 229 patients were divided into three groups according to the fundus changes found. Group I comprised those patients who showed normal fundus oculi pre- and postoperatively during their period of observation. Group II comprised Keith and Wagener's groups one and two and, therefore, included the benign forms of hypertension. Group III included Keith and Wagener's groups three and four and, therefore, comprised those cases showing the potentially benign and the so-called malignant types of essential hypertension. No patients were used in this study who had not been observed for a period of at least three months. The longest period of observation covered five years. Only five patients with normal fundi pre- and postopera-

tively (group I) were found; a number too small to be of any statistical value. However, it was interesting to note that here the average blood-pressure reading was 205/112, and that these patients had a known hypertension of from 9 to 216 months, or an average of 83 months, or 7 years. Their ages ran between 41 and 48 years. Even though the group is small, it does illustrate the point that in essential hypertension the fundi may remain normal even though a high degree of hypertension may have existed for many years.

In evaluating the kidney function of these patients the normal values found by the originators of the test for renal function were used; that is, for the Lashmet-Newburgh concentration test a non-protein specific gravity of the urine of 1.029 or more; for the Van Slyke and Cope urea-clearance test a value of 75 percent to 125 percent of the mean normal. A change in specific gravity of 0.003 or more, or a change of 15 percent or more in the urea-clearance test, was considered significant.

Because of the fluctuations encountered, it is difficult to discuss changes in blood pressure, but for the purpose of classification, the patients were grouped according to changes in blood pressure following splanchnicectomy as follows: (1) Those whose blood pressure was reduced to 160/100 mm. Hg or less were considered as normal; (2) those whose blood pressure did not remain below 160/100, but whose systolic blood pressure was reduced more than 60 mm. Hg, or whose diastolic pressure was reduced more than 30 mm. Hg were considered as improved; (3) those whose systolic pressure was reduced from 30 to 60 mm. Hg, or whose diastolic pressure was reduced from 15 to 30 mm. Hg, were considered as partly improved; and (4) all others were considered as not improved or worse.

Appreciating the difficulties in evaluating the change in fundus from one examination to another, even though accurate and complete fundus findings were dictated at each examination, these evaluations were especially difficult because patients were not seen by the same physician at each examination. However, the findings were accepted at their face value in order to make this study of fundus findings in essential hypertension before and after splanchnicectomy.

A summary of the findings obtained from the statistical data on these 229 patients with essential hypertension, operated on by splanchnicectomy after the method of Dr. Max Peet, was as follows: (1) Essential hypertension is a generalized disease of the peripheral arteriolar system and is characterized by arteriolar sclerosis and arteriolar spasm. (2) The ocular fundi are helpful in evaluating the stage to which the hypertension has progressed and to give a fairly accurate prognosis of the future sequence of events as regards cardiovascular complications. (3) The peculiar fundi give no indication as to the probable success of a splanchnicectomy for hypertension. (4) Benign hypertension may exist for years and yet fundi may be normal. (5) Those cases showing malignant hypertensive fundi have an equal chance of improvement from splanchnicectomy as those not showing angiospastic changes. (6) No sex difference could be found in any comparison of pre- or postoperative findings in essential hypertension. (7) The blood pressure pre- and postoperatively in the cases of essential hypertension which showed angiospastic retinitis was higher than in those showing arteriosclerosis alone. (8) Prognosis for the total number of cases operated upon is slightly under 50 percent for reduction in blood pressure. (9) Prognosis for improvement in appearance of fundi is far better in those showing

angiospastic retinitis than in those showing arteriolar sclerosis. (10) Renal function is impaired in a higher percentage of cases showing angiospastic retinal changes than in those that show no angiospasm. (11) Prognosis for improvement in renal function is the same in the angiospastic as in the nonangiospastic groups of fundus changes. (12) Improvement in subjective symptoms and incapacity follow a parallel ccurse. No difference is found in the amount of improvement in subjective symptoms and incapacity in the benign and malignant forms of fundus changes, but subjective symptoms and some degree of incapacity are more commonly found accompanying the malignant and potentially malignant fundus changes. (13) The subjective improvement of the patient following operation runs over 90 percent and is the most striking result noted and does not in any sense run parallel with objective improvement.

Discussion. Dr. Laurence B. Ellis of Boston said that the results which Dr. Fralick had cited were indeed interesting and significant, from the point of view of the evaluation of hypertensive disease in general and the mode of action of sympathectomy in particular. The ultimate value of sympathectomy can be judged in two ways. On the one hand one can make an estimate of its usefulness from following for a long time the clinical results in the large number of patients who have been subjected to this procedure; and on the other hand one can judge it on theoretical grounds; that is, whether physiologically it is a sound and rational procedure. Dr. Ellis said that he would like to point out that from the empirical and clinical standpoint it cannot be considered that this procedure has become definitely established as a therapeutic measure in hypertension. It is extremely difficult to estimate the value of any form of therapy in a disease such as hypertension which tends to run such a chronic course with frequent spontaneous remissions. Therefore it will be necessary to follow a large number of very well-controlled and studied cases for many years. Moreover, those who are using this operation extensively are not agreed as to what type of case may respond favorably, and there is a lack of concurrence as to the proper operative procedure. Dr. Ellis said that the only therapeutic results that impressed him were the rare cases of so-called malignant hypertension which have responded dramatically for a prolonged period of time. Malignant hypertension is the one form of this disease which one can be reasonably sure will follow an inexorable downward course to fatal termination, and any measure that alters this course, even in a small percentage of cases, must be looked upon with respect. When we come to the theoretical rationale for the procedure we must consider the pathological physiology of the disease. We know that in hypertension there is a generalized increase in peripheral resistance due to a narrowing of the blood vessels, particularly the arterioles, and that this narrowing involves vessels in all parts of the body. Hence, to be sound, a therapeutic measure must lower the blood pressure by decreasing the peripheral resistance and widening the blood vessels, not only in the splanchnic area but also elsewhere in the body and especially in the cerebral and coronary vessels. Otherwise, if the blood pressure is lowered as the result of dilatation of the splanchnic vessels alone, and the blood vessels above the diaphragm remain constricted, the blood flow to the organs supplied by such vessels, in particular the heart and the brain, will be impaired, and deleterious results will eventually take place. A rational proof, therefore, that sympathectomy is a desirable measure will lie in

the unequivocal demonstration that it does, in fact, produce a generalized reduction in peripheral resistance and not one confined to the splanchnic vessels. Further trial of sympathectomy in hypertension under properly cotrolled conditions should be carried out, not only because of the possibility that it may prove therapeutically useful, but also because of the light that may be shed on the pathogenesis of the disease.

Virgil G. Casten,
Recorder.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

January 2, 1939

DR. PERCY FRIDENBERG, *presiding*

SYMPOSIUM ON OPHTHALMIC ALLERGY

DR. M. MURRAY PESHKIN read a paper on the present-day concept of allergy with especial reference to vernal conjunctivitis.

DR. FREDERICK H. THEODORE spoke on the ocular manifestations following serum injections.

DR. BENJAMIN ESTERMAN discussed retinal edema as a manifestation of allergy and presented a number of case histories.

DR. MARION B. SULZBERGER spoke on "Lid involvements of an allergic nature." He pointed out that the skin of the lids may be susceptible to numerous substances to which the conjunctiva is quite immune; also that it is not unusual to find dermatitis of the lids only, with the rest of the facial skin uninvolved. This was probably due to the fact that the eyelid area has greater sensitivity and that anything which gets into the air is more likely to cling to the moist eyelid area. There are numerous types of allergic dermatoses due to drugs, foods, inhalants, infections, and so forth. The case was presented of a woman who had a dermatitis of the eyelids due to lipstick.

DR. JOSEPH LAVAL discussed the subject of allergic manifestations of ocular tuberculosis and described the various forms in which it might occur.

Discussion. Dr. Mark J. Schoenberg stated that he had never seen two members of one family with vernal catarrh. He asked why it appears so frequently in childhood and disappears in adolescence.

Dr. Harvey Thorpe (Pittsburg) said that in vernal catarrh wheallike structures varying from one fourth to one millimeter in diameter appear on the palpebral conjunctiva, especially in the upper lid. They number 1 to 30 or more and appear like small glomeruli under the slitlamp microscope. They differ from, and appear much earlier than, the cobblestone changes in the palpebral conjunctiva. Clinical symptoms without cobblestone changes have been relieved for as long as 2 to 10 years by several applications of the half-strength radium plaques for 20 minutes, filtered with aluminum and rubber. Resistant cases of bulbar vernal catarrh are also helped by radium, without subsequent complications.

Dr. Daniel Rolett asked Dr. Peshkin whether he had noticed any other allergic manifestations along with vernal catarrh. Is radium therapy advisable in cases of vernal catarrh?

In summarizing Dr. Peshkin said that vernal catarrh rarely occurs in more than one member of a family but he did not know why. As to its sudden disappearance, he did not consider that it disappears so suddenly. Radium will not cause permanent disappearance of symptoms nor permanent immunity. In over half the cases seen, other allergic manifestations existed along with vernal catarrh.

Sidney A. Fox,
Secretary.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

SECTIONS ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

March 10, 1939

DR. FRANK N. KNAPP, *president*

RELATION OF DENTISTRY TO EYE, EAR, NOSE, AND THROAT

DR. JOSEPH B. GAIDA, St. Cloud, Minnesota, said one of the first references to the association of ocular and dental diseases is a very ancient one made somewhere about 2000 B.C. by Hammurabi in his famous "Table of disease." Not until the latter part of the eighteenth century was further mention of their connection made in the literature. It was only after the discovery of the X ray as a means of diagnosis that real progress was made in the relation of dentistry to eye, ear, nose, and throat.

The operative field of the dental surgeon is always at the front door of the otolaryngologist. There is no definite dividing line. Their fields are adjacent; the dental surgeon encroaches upon the throat, sinuses, and other structures, and therefore many of these problems are of interest to both professions.

He grouped various symptoms, diseases, and so forth, under different headings, but said the subject matter is such that it does not lend itself to a definite grouping since most if not all of these overlap.

Discussion. Dr. A. J. Trainor, Chief Dental Officer, U. S. Veterans Facility, St. Cloud, Minnesota (by invitation), said in reference to eye conditions caused by dental infections that toward the end of his remarks Dr. Gaida had made the statement: "It is better, however, to have sacrificed mouthfuls of teeth than one seeing eye, as a glass eye has no sight, but artificial teeth do function." It is regrettable that mouthfuls of teeth have been removed to no benefit for the patients concerned. It is commendable that many teeth have been removed to the everlasting gratitude and benefit of many patients, and to a great improvement in many others. He does not feel that many teeth have been removed or ordered removed by the physician with the thought in mind as expressed by Dr. Gaida to the unrestorable detriment of the patients involved without any benefit in return.

OCULAR TUBERCULOSIS, ITS SIMILARITY TO LEPROSY

DR. J. J. PRENDERGAST, St. Paul, read his inaugural thesis.

George E. McGeary,
Secretary-treasurer.

AMERICAN JOURNAL OF OPHTHALMOLOGY

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SCINTILLATING SCOTOMA

All disturbances of vision are of interest to the active ophthalmologist. Many scotomas or other limitations of the field of vision arise from disease entirely outside of the eye, the orbit, or the optic nerve. But the patient who notices anything suddenly wrong with his vision is likely to consult an eye physician. It is because vision is one of the bodily functions and liable to be affected by disease in any part of the body that the person who notices a visual disturbance should go to one who has a medical education, rather than to one who calls himself an optometrist. This condition was called, by de Schweinitz, partial, fugacious amaurosis, with the synonyms "Flimmerskotom" and "migraine ophtalmique"; and by others "blind headache," "neuralgic headache," "sick headache," "fortifications spectra," and "sensory epilepsy." In popular language it has often been called "the dazzles." These names indicate how widely the condition has been known, although the sufferer very often does not seek medical advice.

Such visual disturbance is often associated with migraine, being the first warning of the attack of headache; corresponding to the aura of epilepsy; but it may occur and pass off with little headache, or none. It may occur once, pass off, and never be repeated. More frequently it recurs at more or less definite intervals; and may continue to be a serious

handicap through the years of active life. The first attack may be quite alarming, and the patient's excitement and ignorance about it will be confusing to the doctor. In any case an eye physician should be well enough acquainted with the literature to make a diagnosis and give a probable prognosis. The patient will feel greatly helped by some understanding of his trouble and of what may be expected with regard to it.

The seat of the disturbance is clearly in the central nervous system. Generally it has been ascribed to vasomotor influence, in the cortical visual centers. But in some cases it may affect the visual pathways; possibly in the region of the optic chiasm and the hypophysis. The exact pathology of such attacks is not known. They often begin soon after puberty, and, in the majority of cases, the attacks get less severe and cease in middle or later life.

In 1887 Weir Mitchell reported a series of six cases in which the typical form of scotoma that had recurred for several years was replaced by what were distinctly visual illusions. In one there appeared a red blur, which took the form of a relative covered with blood; in another a silvery terrace covered with brilliant flowers was seen; in another there were geometric figures colored pink and red, and later rapidly revolving red circles. One patient saw a silver crescent from which were suspended several heads seen in profile; another saw a large red spider. Still another saw figures veiled in white passing one after the other.

That such illusions may be met with in cases of scintillating scotoma, should be known to every practicing ophthalmologist. In none of the above cases was there evidence of eyestrain. But relief of eyestrain has often brought a cessation of such attacks. A girl of 15 in school was having attacks of migraine, one or more times a week. She was given correcting lenses: R. +0.75 D.sph. and L. +0.62 D.sph. with 0.25 cylinder, for constant use. The headaches ceased, and she left off her glasses for a day with a return of the migraine. After that her glasses were broken, she went a day without them, and again had an attack of migraine. When she was 30 she stopped wearing glasses, and had no return of her trouble.

Of late years there have been very few papers on scintillating scotoma. Fifty years ago a number of descriptions of their own cases were written by ophthalmologists and other physicians. Such cases still occur, and the eye physician should be prepared to deal with them. Then, too, the field of visual neurology has been gradually extended, and a better understanding of what may be feared as a form of commencing blindness is needed by physicians who are not acquainted with the older literature.

Edward Jackson.

ORTHOPTIC TRAINING—A POSSIBLE SOLUTION

In recent years the science of orthoptics has made such great advances that there has been developed a group of highly trained technicians. The importance of the training and qualifications of these orthoptists has been recognized as an ophthalmological responsibility and has resulted in the establishment of the American Orthoptic Council sponsored by the three national eye societies. The American Orthoptic Council, which held its first examinations in 1939 in New York and Chicago, has issued certificates to 20 such trained technicians.

As pointed out by the American Orthoptic Council in its report to the American Academy of Ophthalmology and Oto-laryngology, "the value of orthoptic

training properly carried out has been affirmed by a sufficient number of intellectually capable and unimpeachably honest ophthalmologists as to be undebatable." Ophthalmologists are beginning to realize that if orthoptic training is to produce the desired results one of these highly trained technicians, together with an array of rather expensive equipment, is necessary.

There are very few offices in this country that would have sufficient work of this character to keep such a technician occupied. The operation by an ophthalmologist of such a plant, which would also accept patients from other oculists, would for obvious reasons not be feasible. The establishment of such an office owned and operated by a technician also does not completely solve the problem, as it seems rather essential that the training be done under the guidance and control of the ophthalmologist. What appears to be a solution has been carried out successfully for over a year in San Francisco.

Realizing the desirability of a properly equipped laboratory to which patients could be sent for orthoptic training under skilled guidance, a group of nine or ten ophthalmologists organized the "San Francisco Ophthalmic Laboratory." This group guaranteed financial support for a year while the idea was on trial. After the first three modest monthly assessments the laboratory was found to be self-supporting. Since that time the salary of the technician has been increased, the equipment is being paid for, and a reserve fund for depreciation created.

This well-equipped laboratory is conducted by a trained technician who holds the certificate of the American Orthoptic Council. The policy of the laboratory is decided by a committee of the ophthalmologists interested. Being a coöperative concern conducted to be run on a very narrow margin of profit, it has been possible to make the fees for training reasonable. The laboratory has been made available to all reputable ophthalmologists.

The patient is sent to the laboratory for an examination to determine whether or not orthoptic training is indicated and practical. The technician does not advise the patient of the result but sends the report to the physician. The oculist in turn decides, often after consultation with the orthoptist, the best course to be followed and discusses the treatment with the patient or, in the case of a child, the parent. During the course of treatment the physician is advised by report as to the progress made. Upon completion of the preagreed number of treatments, a written report is again sent to the patient's oculist and an appointment made for the patient to consult him. At this time the patient is reëxamined by the ophthalmologist, and from his results he determines whether or not further treatment is indicated. Thus the control of the case remains in the hands of the ophthalmologist.

The results in the past year have been excellent, on the whole, and it has already become necessary to obtain additional help in the laboratory.

In addition to orthoptic training, equipment for other examinations has also been added, which helps to make the service more useful. With all the publicity given to reading speed and its relation to school work, it has also been a great convenience to be able to send the patient for this test when the occasion arose. The laboratory has also installed a Bio-Photometer so that dark-adaptation tests are available to any physician.

This type of laboratory has possibilities of expanding and rendering further service to the ophthalmologist. The committee in charge is at present investigating the possibility of installing the necessary equipment and obtaining a properly

trained technician for testing for aniseikonia.

It would seem then as if the coöperative ophthalmic laboratory may solve not only the difficulty of obtaining proper orthoptic exercises but also other problems; problems that require expensive equipment and highly trained technicians who should be under the direction of the ophthalmologist but because of the financial aspects cannot be included in the average office.

With the training of these technicians according to the standards suggested by the American Orthoptic Council and with their certification by this Council, there should be no difficulty in obtaining properly trained individuals and duplicating the laboratory described.

Frederick C. Cordes.

DR. ALFRED BIELSCHOWSKY

It is fitting that a tribute should be paid in the American Journal of Ophthalmology on the death of one of its most distinguished and frequent contributors in recent years. While it is not the intention to present a full biography of Dr. Alfred Bielschowsky—for this has been made available to American opththalmologists in other publications—a brief outline of his life and the nature of his contributions deserve to be the theme of a Journal editorial.

Born on December 9, 1871, in Silesia, Germany, where he also received his preliminary education, Dr. Bielschowsky studied in Breslau, Leipzig, and Berlin, receiving from the University of Berlin his degree of doctor of medicine in 1894. There followed his appointment to a post in the clinic of Dr. Sattler (University of Leipzig), where he remained until 1912. Here his association with the physiologist Ewald Hering was productive of several important papers, and here it was that he became interested in ocular-motor phenomena, which for him became a life-long study. For 11 years thereafter he served as professor of ophthalmology at the University of Marburg, returning thence to the University of Breslau.

It was not until 1934 that most American ophthalmologists became personally acquainted with Dr. Bielschowsky. During that year he visited the United States and became especially interested in the work of Dr. Ames and his confrères on aniseikonia. This led to his association with the clinic at Dartmouth, and upon its reorganization in 1937 he was appointed professor of ophthalmology in the medical school and first director of the department.

Dr. Bielschowsky's interest in aniseikonia first brought this Journal editor, who also was studying the subject, somewhat closely into association with him. His knowledge of ocular motility was undoubtedly more profound than that of anyone previously in the field of ophthalmology. The Journal was extremely fortunate in obtaining for publication the lectures which Dr. Bielschowsky presented before the Seventh Annual Mid-Winter Clinical Course of the Research Study Club at Los Angeles, in January, 1938. These appeared in consecutive issues during 1938 and 1939. They are undoubtedly the best contributions on the motor anomalies published in the English language and recently have been collected as a monograph.

Probably because most American ophthalmologists lack the ability to follow foreign literature with ease, they had no wide-spread acquaintance with Dr. Bielschowsky's earlier European writings on ocular motility and retinal correspondence, and their importance in orthoptic training. Thus it was not until Dr. Bielschowsky came to this country and began to lecture that the attention of the mass

of ophthalmologists was brought to the modern concepts of this subject, and to him can be attributed much of the revival of interest in orthoptics.

He was, as are all great men, modest and unassuming. The profundity of his knowledge of ophthalmology became at once apparent when he began to talk on any ophthalmic subject. Not only did he elucidate the many intricacies of ocular-muscle balance and function, but it was perhaps more because of the great weight which his authority carried than for any other reason that the outstanding contributions on aniseikonia from the Dartmouth Clinic were given careful consideration by all ophthalmologists.

An indication of the extent of his contributions to ophthalmology is the mere fact that he published more than 125 papers on this subject during his life time. Naturally, stimulated by his early association with Hering, physiology was the particular phase of the motor anomalies that interested him, whereas he accepted the anatomic work of former investigators on the subject. A further indication of his value to American ophthalmologists is the fact that he delivered in this country 123 lectures in addition to papers before scientific societies.

His death is a great loss and he will be greatly missed.

Lawrence T. Post.

TESTING SCHOOL CHILDREN

Few today would deny that the system of testing the eyes of school children has proved of great benefit to the community. Most ophthalmologists, on the other hand, and many educational workers, are well aware that the methods usually applied to such testing are far from perfect.

Compared with the previous lack of any form of group testing of children's eyes, the present gain is unmistakable. Formerly, attention to ocular defects during school life depended entirely upon the individual initiative of parent or teacher. Many children, with glaring ocular disabilities, had at least to struggle on into adult life before learning how much they had missed during the period of growth and study, and how much they could gain by proper ophthalmic care.

The emphasis so far has been too greatly on the more obvious deficiencies of visual acuity and muscular coördination, together with a few cases of downright ocular disease. For one thing, in most of the public schools, the mere problem of numbers is somewhat overwhelming. Examination of all school children by physicians, thoroughly undertaken, would involve great expense. Most of the teachers in public schools are already heavily burdened, so that they can with difficulty spare time for detailed examination of the eyes of their pupils. Many of the larger school systems have delegated the examination to nurses, although the teacher's daily contact with the pupil must always possess a special value in the individual case. Even at the hands of non-medical workers, the ideal sort of ocular testing would require a not insignificant expenditure for materials and personnel, beside the provision of certain architectural facilities.

No child should be precluded by visual difficulties from making the best of his school days. Improvements in method must be developed, in spite of expense and other obstacles. Physicians must be increasingly called upon, at least to supervise and instruct others in the work. Equipment should be adequate, and teachers and nurses should receive ample training in principles and technique.

Credit is due for a great deal of sincere effort on the part of those who perform these duties. The children who reach the ophthalmologist as a result of school ex-

amination are usually in definite need of attention, and only occasionally is it necessary for the physician to declare that a false alarm has been sounded. Furthermore, on account of more or less obvious symptoms of eyestrain, intelligent school teachers frequently recommend examination of the eyes of pupils who have shown no imperfection in the reading of letter charts.

Factors often requiring closer care include accurate placing of the test chart as to distance and lighting, precaution that the child does not mislead as to the actual condition of his eyes, and the demonstration of causes of eyestrain in spite of the presence of good visual acuity. For rapid work in literate children, the letter cards are more convenient and more reliable than other test materials. But it is advisable to have more than one arrangement of test letters, because children often memorize so easily that the record for the second eye is unreliable. Sufficient care is not always taken that one child shall not have opportunity to learn the letters from another.

It should surely not be too difficult, nor too expensive, to provide teachers with a very small set of plus spheres by means of which they might demonstrate significant amounts of hyperopia. Over the protests of some other writers, Eames (Journal of Educational Research, 1940, March, page 524) would also include in the "battery" of tests to be used by school teachers or nurses (1) the radiating-line or wagon-wheel test for astigmatism, (2) a simple stereoscopic test (chicken in box) for incoördination of the two eyes (heterophoria), and (3) a simple stereoscopic test for defects of binocular vision.

Unfortunately, many ophthalmologists still find it hard to believe in juvenile eyestrain which depends upon a low refractive error. Yet in many children, especially those of eager and intelligent minds, eyestrain may be based upon hyperopic or astigmatic defects which would often be regarded as small even in an adult. In a sturdy boy of seven years a hyperopia of one diopter was responsible for frequent complaint of headache, which disappeared completely with the use of full correction. A physician's daughter, before school age, had repeated attacks of conjunctival redness, which yielded promptly to the wearing of a low astigmatic correction, after a long period in which the use of glasses was rejected by her parents. Many similar cases might easily be cited.

Other symptoms of eyestrain, to be considered in small children as well as in older boys and girls or adults, include car-sickness, styes or chalazia, blepharitis, and phlyctenules. Reading difficulties, although sometimes no doubt definitely cerebral in origin, may be induced particularly by a poorly developed power of attention in combination with a moderate refractive error.

It would be foolish to argue that responsibility for arriving at conclusions in such matters should be placed upon the nurse or school teacher. For the final examination and opinion an ophthalmologist must be responsible. One important need is that the teacher or nurse shall be familiar with the list of disturbances that may arise from refractive errors, and shall be prepared to call attention to the possibility that a child requires expert examination. The other important need is that the ophthalmologist, in addition to possessing the proper skill in refraction, shall keep an open mind as to the capacity of the juvenile organism for an extensive symptomatology arising from refractive defects of the eye.

The arbitrary assumption that in a child nothing less than a certain stated amount of hyperopia (say 1.25 D.) or astigmatism (say 1.00 D.) calls for correction with glasses, is prejudicial to the

interest of the child, especially when we remember that even under supposed cycloplegia the hyperopic or astigmatic error is more likely to be underestimated than overestimated.

Instruction in the broad principles of human refraction now forms a part of some college curricula in educational method. Ophthalmologists may well cooperate in developing an improved understanding of the subject among the teaching profession.

W. H. Crisp.

BOOK NOTICES

SELECTED PICTURES OF EXTRA-OCULAR AFFECTIONS from the Museum of the Government Ophthalmic Hospital, Madras, with explanatory notes. By Lt.-Col. R. E. Wright in collaboration with Rao Bahadur Dr. K. Koman Nayar. Government Press, Madras, 1938. Price Rupees 2/-.

This is a portfolio containing approximately one hundred pairs of stereoscopic photographs (black and white) of a great variety of clinical conditions encountered in India. Supplementary notes are given for each case. The author in chief suggests that the pictures may be studied stereoscopically by means of a pair of +6 D. spheres set in a trial frame with their optical centers 70 or 80 mm. apart. The illustrations are printed on plate paper.

W. H. Crisp.

A GUIDE TO OPHTHALMIC OPERATIONS. By J. Bruce Hamilton. Clothbound, 202 pages, no illustrations. London, H. K. Lewis & Co. Ltd., 1940. Price 10s. 6d. net.

The title is misleading in that it does not indicate the purpose of the book, which is the preparation of the patient and the operating room. It is not a treatise on ophthalmic operations themselves.

The text is divided into two parts and an appendix. Part II contains nine tenths of the material.

Part I contains data on dosage, weights and measures, methods of preparing dressings, preoperative preparation of the patient, the care and sterilization of instruments, preparation of sutures, and items on anesthesia. Part II is a discussion of the preoperative and postoperative treatment and of the instruments and drugs to be used in a large series of operations listed alphabetically.

Many of the general suggestions given in the book are excellent, and as a guide for nurses in laying out instruments it might be valuable. As is always the case, there is so much individual variation that the desires of one surgeon are not exactly those of another. In most cases more instruments are advised for preparation than seem necessary. It is difficult to imagine that it would be satisfactory to turn the book over to the operating-room nurse to follow exactly. It does not seem that there is any good general substitute for the surgeon's or his assistant's supervision of instruments before operations unless, of course, the same surgical nurse is constantly in attendance. As a guide to the inexperienced intern or operating-room nurse it might prove of real value.

Lawrence T. Post.

IL TRACOMA, Manuale pratico ad uso dei medici generici e degli studenti (Trachoma, practical manual for use of general physicians and students). By Lorenzo Bardelli. 188 pages, 53 illustrations of which 11 are colored lithographs, and the Mappa Mundi of

trachoma. Published by Casa Editrice Marzocco, Florence, 1940. Price, cloth-bound, 60 lire.

The world map of trachoma was presented by the author to the Thirteenth International Congress of Ophthalmology, held in Amsterdam in 1929. Inside the back cover of the volume is a binocular lens holder for viewing a large number of stereoscopic pairs of illustrations which are included in the volume.

Trachoma is very common in Italy, having appeared in 63.5 per thousand of military recruits in Sardinia, and in 29.8 per thousand of the recruits in Sicily, and being probably even more frequent than is indicated by these figures, inasmuch as the disease is regarded as being more widespread among women than men. The author therefore finds substantial basis for speaking of trachoma as a disease whose social importance is as great as and perhaps greater than that of tuberculosis. The volume is arranged under the following headings: anatomic details, details of general pathology, clinical course, treatment of trachoma and its complications, prophylaxis. The author accepts the now prevalent view that trachoma is due to an ultravirus. The text is beautifully printed on a fine quality of mat-surface paper which lends itself to clear reproduction of the numerous illustrations.

W. H. Crisp.

CORRESPONDENCE

Nutrition and myopia

Budapest 20, 3, 1940

Dear Sir,

Concerning Dr. A. A. Knapp's article published in this Journal (v. 22, no. 12, 1939, Dec.) I would like to add a few remarks. In 1933 I showed that in the etiology of high myopia (from 5.0 to 30.0 D.) rachitis must play a leading role (Klin. M. f. Augenh., vol. 90, April: "Die degenerativen Stigmata hochgradiger Myopen"). In trying to prove this I constructed graphs visualizing the fact that among degenerative signs those of old rachitis are dominating. As a conclusion I stated the following: "Taking into consideration the frequency of rachitic signs and high percentage of caries and dental abnormalities in progressive myopia, and, further, the importance of late familial syphilis, it may be supposed that pathological weakening of the fibrous tunic is produced by disturbed metabolism, hereditary or acquired, or by nutritional disturbances. Not only bones and teeth are affected but the lens, epithelial structures, and connective tissue also. Furthermore it is obvious that in a certain part of these disturbances we have to deal with endocrine imbalance." As a result of the theory mentioned above, I prescribe to young myopics systematically cod-liver oil, calcium, phosphorus, and vitamin-rich diet, and my aim is to improve general health.

I am, Sir,

Yours very sincerely,

Prof. J. Brana, M.D.

General in the Army Medical Corps.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

ASSISTED BY DR. GEORGE A. FILMER

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

5

CONJUNCTIVA

Ayberk, N. F. **A case of amyloid degeneration of the conjunctiva.** Türk Oft. Gazetesi, 1936, v. 2, pt. 1, p. 20. (French abstract: 1936, v. 2, pt. 3, p. 174.)

This case was unusual because of the youth of the patient (six years), involvement of the right eye only, the presence in the conjunctival smears of large rods similar to tubercle bacilli, and enlargement of the preauricular and submaxillary glands.

George H. Stine.

Aydin, M. R. **Two cases of hyaline and amyloid degeneration of the conjunctiva.** Türk. Oft. Gazetesi, 1936, v. 2, pt. 4, p. 181. (French abstract: 1937, v. 2, pt. 6, p. 329.)

Both cases occurred in adults with old cicatricial trachoma.

George H. Stine.

Bengisu, Naci. **Meningococcic conjunctivitis.** Türk Oft. Gazetesi, 1936, v. 2, pt. 3, p. 139. (French abstract: 1937, v. 2, pt. 5, p. 277.)

A case of meningococcic conjunctivitis with meningitis.

George H. Stine.

Bilger, Izzet. **A case of amyloid degeneration of the conjunctiva.** Türk. Oft. Gazetesi, 1936, v. 2, pt. 2, p. 73. (French abstract: 1936, v. 2, pt. 4, p. 232.)

This patient, aged thirty years, had had for four years a bilateral hyperplastic trachoma. There was involvement of the preauricular and submaxillary glands. The tissue was removed surgically and biopsy performed.

George H. Stine.

Ciotola, Guido. **The Weil-Félix reaction in trachoma.** Boll. d'Ocul., 1939, v. 18, Jan., pp. 11-18.

The writer tested for the Weil-Félix reaction in the blood of patients affected by trachoma in different stages of the disease. Results were negative in almost all cases. He also injected

trachomatous material intravenously or intraperitoneally in four rabbits, and found that the serum of the animals failed to agglutinate the strains of proteus. (Bibliography.) M. Lombardo.

Lugossy, Gyula. **The problem of chemotherapy in trachoma.** Szemészet, 1939, v. 2, Dec., p. 8.

Sulphanilamide preparations were found to be of the greatest value in those cases of trachoma which were complicated by pannus and corneal ulcers. The pannus cleared up within a week and the ulcers became epithelized. Sulphanilamide itself does not cure trachoma but hastens the curative effect of such remedies as injection of foreign protein. In cases where the cornea was not implicated, as in paratrachoma, inclusion blennorrhea, and ophthalmia neonatorum, the conjunctival changes remained uninfluenced, but the subjective feeling of discomfort, photophobia, and lacrimation became alleviated within two or three days. The author gives two to three tablets for three or four days and repeats the course after an interval of one week. R. Grunfeld.

McKee, S. H. **Inclusion conjunctivitis.** Canadian Med. Assoc. Jour., 1939, v. 41, Dec., pp. 535-541.

A review and discussion of the present status of the subject of inclusion conjunctivitis with emphasis on the etiologic background. T. E. Sanders.

Magitot, A., Dubois-Poulsen, A., and Geffroy, Y. **Treatment of gonococcus conjunctivitis by 1162 F.** Bull. Soc. d'Opht. de Paris, 1938, Feb., p. 82.

After reporting five cases of gonorrheal conjunctivitis treated with 1162 F (para-amino-phenyl-sulfamide), the authors conclude that no other form of treatment has produced such a clear and powerful effect upon this disease. It is probable that rapid cure of the conjunctivitis leaves no time for keratitis to develop. Gonorrheal conjunctivitis is becoming more and more rare in France but about half the cases of congenital blindness in certain regions are due to the gonococcus and the proportion remains high in North Africa. Jerome B. Thomas.

Rigg, J. P., and Waldapfel, R. **Acute abscess of the lymph follicles of the conjunctiva.** Arch. of Ophth., 1939, v. 22, Nov., pp. 882-885.

A patient aged 35 years presented a small elevation with a yellowish center and a deeply inflamed margin in the bulbar conjunctiva midway between the limbus and the caruncle of one eye. The picture was very similar to the acute infections of lymphoid tissues seen in mucous membranes. The clinical appearance is shown in a photograph. J. Hewitt Judd.

Rivera, E. M. **Sulphanilamide in ophthalmia neonatorum.** Rev. Cubana de Oto-Neuro-Oft., 1939, v. 8, Jan.-Feb., p. 5.

The author reports fifteen cases of gonococcal ophthalmia in infants treated with sulphanilamide by mouth. The initial dose varied from 3.75 to 5 grains per day. A cure was effected in every case. Edward P. Burch.

Sezer, Necdet. **Primary conjunctival tuberculosis.** Türk Oft. Gazetesi, 1937, v. 2, pt. 6, p. 282. (French abstract: 1938, v. 2, pt. 9, p. 471.)

A man twenty years of age, normal in every other respect, developed left preauricular and submaxillary adenopathy followed by a conjunctival ulceration of the left lower eyelid which was

covered by mucopurulent secretion. Tubercle bacilli were not found in the secretion, but there were marked local and focal reactions to tuberculin. The lid lesion and the fistulas of the glands healed in time. The author points out the rarity of the condition and the finding of the tubercle bacilli in but one case in four. George H. Stine.

Spining, W. D. **Some observations on the use of sulphanilamide in trachoma and associated ocular conditions.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 271-274.

Swan, K. C., Trussell, R. E., and Allen, J. H. **pH of secretion in normal conjunctival sac determined by glass electrode.** Proc. Soc. Exper. Biol. and Med., 1939, v. 42, Oct., pp. 296-298.

The pH of the conjunctival secretion was determined by placing a specially designed glass electrode in direct contact with the conjunctiva. In a series of 88 adults the mean pH was found to be 7.23. Stimulation of lacrimation resulted in an increased alkalinity.
T. E. Sanders.

Szinegh, Béla. **Newer contributions to the chemotherapy of trachoma.** Szemészet, 1939, v. 2, Dec., p. 16.

The author assumes the existence of a pathogenic relation between trachoma and gonorrhea. Since ronin (2-sulphanilylaminopyridin) proved more effective in the treatment of gonorrhea than any other sulphanilamide preparation, he expected the same result in the treatment of trachoma. But ronin had no advantage over other sulphanilamide preparations. Local application of prontosil to the conjunctiva proved to be valueless and this confirmed the author's contention that sulphanilamide preparations act only by way of the reticulo-endothelial system. The author prescribes one tablet of ronin three times daily for five days and repeats the course after five to seven days. The subjective symptoms disappear after two to three days and the pannus clears up in six to nine days. R. Grunfeld.

Tillé, H., and Gropper. **Microbiology of the ocular conjunctiva.** Bull. Soc. d'Opht. de Paris, 1938, June, p. 311.

Of 402 cases of conjunctivitis, pneumococcus was found in 30 percent, the Morax diplobacillus in 7.2 percent, staphylococcus in 6.5 percent, gonococcus in 4.5 percent, the Weeks bacillus in 1 percent. In a bacteriologic study of 598 preoperative examinations of conjunctivae considered clinically normal, pneumococcus was found in 207 (more than one third of the cases), staphylococcus in 23 cases, and the Morax diplobacillus in 29 cases. In 314 cases no bacteria were found. Jerome B. Thomas.

6

CORNEA AND SCLERA

Dean, A. B., Dean, F. W., and McCutchan, G. R. **Interstitial keratitis caused by specific sensitivity to ingested foods.** Arch. of Ophth., 1940, v. 23, Jan., pp. 48-54; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1939, 90th mtg.

An interstitial keratitis of the inflammatory type was observed in six persons, and was relieved in each case by omitting certain articles of food from the diet. The determination of the sensitizing foods had been made either by history, by elimination, or by cutaneous tests. The ciliary injection and pain disappeared within 48 hours after the allergen had been removed. (Discussion.) J. Hewitt Judd.

Fallica, G. **Changes of curvature of the anterior surface of the cornea by contraction of the extrinsic muscles.**

Boll. d'Ocul., 1939, v. 18, Feb., pp. 53-65.

Results obtained from ophthalmometric measurement of the changes in curvature of the cornea by contraction of the lateral muscles in patients of 13 to 46 years are given in tabulated form. Contraction of these muscles provokes a tendency toward astigmatism against the rule. (Bibliography.)

M. Lombardo.

Fronimopoulos, John. **What influence has vitamin-A deficiency on the development of the relapsing seasonal disease, allergic (scrofulous) keratoconjunctivitis?** Klin. M. f. Augenh., 1940, v. 104, Jan., p. 1.

In the majority of 41 patients with various forms of allergic (scrofulous) keratoconjunctivitis, the author found a relative hypovitaminosis-A which was attributed to insufficient nutrition. The hypovitaminosis was determined by the measurement of vitamin A in the blood serum and by dark-adaptation tests. Histologic smears of the conjunctiva showed keratinized epithelial cells. After the inflammation had subsided the vitamin-A value rose, but not to physiologic limits. If the vitamin-A value had reached the physiologic limit, no relapses occurred after treatment. The frequency of this conjunctivitis in the spring is ascribed to insufficient nutrition during the winter due to lack of green vegetables, fresh butter, fat, and meat.

C. Zimmermann.

Pillat, A. **Circumscribed melanoses and pigmented nevi on the surface of the cornea.** Klin. M. f. Augenh., 1940, v. 102, Jan., p. 39.

Four cases of superficial melanosis and one case of pigmented nevus are described. They begin at the limbus and extend in a sector toward the center, flat in the epithelium, and cause no unevenness of the surface. The other parts of the eye show no pigment abnormalities. The growths remain unchanged in form, color, and extent. As the cornea contains no blood vessels or lymphatics, the development of melanin in the melanoblasts cannot depend upon them. In the observed cases there was no visual impairment.

C. Zimmermann.

Vannas, Mauno. **Contribution to corneal transplantation with some proposals for improvement of the operative technique.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 709-724.

The transplant must be taken from the donor's eye without damage to the endothelium. The author makes use of an oval punch, one blade of which is passed into the anterior chamber through a small incision. When incisions are made to remove the graft, its outlines can be indicated on the cornea with a stamp containing needles at the angles. The writer has injected 10-percent gelatin into the anterior chamber of the host eye to deepen the chamber, and uses a wooden spatula inserted into the aqueous chamber when there is a dense leucoma which renders the anterior chamber invisible. An operative method is described in which the donor's cornea is trephined from the endothelial surface. The author recommends fixation of the graft by a thin and elastic piece of rubber sutured at the limbus. Grafts from enucleated eyes and from cadaver eyes were of equal value. Corneal grafts from infants' eyes caused the recipient eyes to become highly myopic, necessitating the wearing of contact glasses.

C. A. Perera and U. Ollendorff.

Zavalia, A. U., and Oliva, R. O. **Chrysiasis of the cornea during course of treatment with sanochrysin.** Arch.

de Oft. de Buenos Aires, 1939, v. 14, Feb., p. 182.

The authors describe the impregnation of the cornea with gold salts which takes place during the administration of sanochrysin in the treatment of ocular tuberculosis. Two types of corneal impregnation are described: first, the invasion of the central portion of the more superficial layers by crystals, which takes place during the early phase of treatment; and second, the invasion of the deeper layers in the region of Descemet's membrane in the form of fine, reddish-gold dust-like deposits, which is more pronounced at the periphery during the later stage of therapy. The opinion is hazarded that the two types of impregnation represent different chemical combinations of gold. The gold impregnation subsides slowly after treatment is discontinued. Edward P. Burch.

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Gabrielidès, C. **Contribution to the study of heterochromia (Fuchs).** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 206.

During a five-year period, 12 cases of heterochromia were observed among a total of 30,000 ophthalmic patients. The classic triad of heterochromia iridis, chronic cyclitis, and cataract was found in 11 of the cases. The author recommends intracapsular extraction of the cataract, and has noted disappearance of posterior corneal precipitates following cataract extraction.

George A. Filmer.

Kassner, Hans. **Pseudoglioma presenting clinically and anatomically the aspect of true glioma.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 625.

A tumor-like metastatic inflammation of the choroid occurring after varicella in a child of 18 months had been diagnosed as a glioma because of haziness of the cornea and a yellow ophthalmoscopic reflex. The eye was enucleated and a histologic description is given.

C. Zimmermann.

Lucic, Hugo. **Ocular reactions to diphtheroid bacilli.** Arch. of Ophth., 1939, v. 22, Nov., pp. 849-866.

As a result of animal experimentation it was found that diphtheroids obtained from the eye have insufficient antigenic value when used alone to cause sensitivity or intoxication, but when used in conjunction with uveal tissue their antigenic power may be enhanced. There is some suggestive evidence that the addition of pigment may provoke special sensitization of the eye. A general sensitization results when the diphtheroids are used in conjunction with staphylotoxin and an ocular intoxication may be elicited in some instances by either local or systemic injections of the diphtheroid antigen. The histologic picture of the allergic reaction consists of nests of epithelioid cells, with pigment phagocytosis in focal areas in the uveal tract, and resembles the histologic picture of sympathetic ophthalmia. (Photomicrographs.)

J. Hewitt Judd.

Trantas, A., and Trantas, N. **Melanoma (nevus) of the iridocorneal angle.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 186.

Description of a small, strawberry-like, black nevus protruding into the aqueous from the angle. The tumor was seen by gonioscopy.

George A. Filmer.

Weskamp, R. L., and Boccalandro, C. **Epidemic parotitis and choroiditis.**

Arch. de Oft. de Buenos Aires, 1939, v. 14, Feb., p. 193.

The authors state that although ocular complications do occur in epidemic parotitis they are usually of a benign nature, involving the lacrimal gland or anterior ocular segment. In the present case, however, choroiditis of a severe type was a complicating feature. The patient, a twenty-year-old soldier, developed an abortive mumps meningitis and a choroidal lesion of the right eye. A very comprehensive survey to determine the etiology of the choroiditis failed to reveal any of the common systemic factors. The conclusion is reached that the lesion was associated with the parotitis. The authors believe that in their case uveoparotid fever did not come into question because of the posterior location of the lesion.

Edward P. Burch.

8

GLAUCOMA AND OCULAR TENSION

Ballantyne, A. J. **Buphthalmos with facial nevus and allied conditions.** Brit. Jour. Ophth., 1940, v. 24, Feb., pp. 65-66.

These notes supplement a previous article (see Amer. Jour. Ophth., 1931, v. 14, Jan., p. 75). The case is of a boy, seen first at the age of three weeks, again at two years and nine months, and finally at the age of eight years in 1938. The affected eye was excised and was found to contain a moderately extensive angioma of the choroid. In discussing the literature, the author states that the absence of evidence of choroidal angioma in many of the published cases does not exclude the possibility that such a lesion existed. (Photomicrograph.) D. F. Harbridge.

Bengisu, Naci. **A case of facial nevus associated with retinitis proliferans.** Türk Oft. Gazetesi, 1937, v. 2, pt. 5, p. 253. (French abstract: 1937, v. 8, pt. 2, p. 415.) (See Section 10, Retina and vitreous.)

Goar, E. L., and Schultz, J. F. **Iridencleisis in glaucoma.** Arch. of Ophth., 1939, v. 22, Dec., pp. 1035-1045; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1939, 90th mtg.

The literature is briefly reviewed and the authors' technique outlined as used on 72 eyes in 52 patients. In this group the tension was reduced to normal in 96 percent, although miotics were used in a few of the cases. Vision was improved in 25 percent, remained stationary in 63 percent, and decreased in 12 percent. The visual fields improved in 20 percent, were stationary in 69 percent, and decreased in 11 percent. Complications due to the operation are very few, and it has the advantages of rapid reformation of the anterior chamber and comparative freedom from late infections. The scratch incision advocated allows the anterior chamber to be entered closer to the base of the iris than with the conventional keratome incision, and makes it unnecessary for any instrument to enter the anterior chamber. A shallow anterior chamber does not make the operation more difficult. (Discussion.) J. Hewitt Judd.

Igersheimer, J. **A case of spontaneous perforation of the globe.** Türk Oft. Gazetesi, 1936, v. 2, pt. 2, p. 49. (French abstract: 1936, v. 2, pt. 4, p. 229.)

An eye with absolute glaucoma of five years standing in a man 75 years of age suddenly developed perforation of the cornea, apparently due to a retrochoroidal hemorrhage.

George H. Stine.

Irvine, Rodman. **Exfoliation of the lens capsule (glaucoma capsularis).**

Arch. of Ophth., 1940, v. 23, Jan., pp. 138-160. (See Section 9, Crystalline lens.)

Joannides, T. **A case of superficial exfoliation of the anterior capsule with glaucoma capsularis of Vogt.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 169. (See Section 9, Crystalline lens.)

MacMillan, J. A. **Injection of air as factor in maintaining filtration after corneoscleral trephining in glaucoma.** Arch. of Ophth., 1939, v. 22, Dec., pp. 968-973; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 127.

Based on experimental and clinical evidence it has been found that the presence of air beneath the conjunctiva and in the anterior chamber is useful in restoration of the anterior chamber and the formation of a diffuse bleb. A fine, curved, lacrimal syringe needle is passed beneath the flap into the trephine hole and air injected directly into the anterior chamber, and then beneath the flap. After completion of the suture, more air is injected beneath the flap. The aqueous replaces the air in the anterior chamber in about a week's time. The air beneath the conjunctiva prevents adhesions from the flap to the underlying sclera for approximately eight days, which is the time required for its complete absorption. (Discussion.) J. Hewitt Judd.

Salzmann, Maximilian. **Prepapillary proliferation of connective tissue in glaucoma, and its relation to retinitis proliferans.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 629-654.

After a discussion of the various forms of glaucomatous excavation of the nerve-head, the author describes prepapillary proliferation of connective tissue. The main characteristics include its situation in front of the glia-meniscus of the papilla, its collagenous nature, and its new-formed blood vessels. From a study of 100 glaucomatous eyes, 19 examples with prepapillary tissue were found and are described. Eight of the 19 were instances of primary glaucoma. The blood vessels of the optic nerve and retina in these cases showed obliterative and proliferative changes. The author voices his objection to Leber's opinion that prepapillary proliferation of connective tissue results from organization of extravasated substance. The writer believes that retinitis proliferans and the development of prepapillary connective tissue have a common basis in which vascular degeneration and proliferation play a part.

C. A. Perera and U. Ollendorff.

Schoenberg, M. J. **Psychomatic interrelations; their therapeutic implications in glaucoma.** Arch. of Ophth., 1940, v. 23, Jan., pp. 91-103; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 134.

The author reports four cases illustrating the importance of investigating the psychic difficulties of patients with glaucoma. For those patients whose condition is complicated by a state of anxiety, psychotherapy is sometimes as essential as somatic therapy. (Discussion.) J. Hewitt Judd.

Schoenberg, M. J. **Role of the states of anxiety in the pathogenesis of primary glaucoma.** Arch. of Ophth., 1940, v. 23, Jan., pp. 76-86.

In a certain percentage of cases, states of anxiety act as a precipitating factor in the development or maintenance of a high intraocular pressure in glaucomatous patients. The disturbances of physiologic processes caused

by states of anxiety and their anatomic bases are reviewed, and the relation between states of anxiety and hypertensive crises in glaucoma is discussed. It is pointed out that some of the glaucomatous crises are preventable with proper attention to the patient's emotional life. (Discussion.)

J. Hewitt Judd.

Trantas, A. **Senile exfoliation of the anterior capsule.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 226. (See Section 9, Crystalline lens.)

Vogt, Alfred. **Cyclodiathermy puncture in glaucoma.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 591.

Vogt, who has applied cyclodiathermy puncture for 3½ years, reports his method and recommends it in cases of chronic primary glaucoma in which iridectomy or trephining has failed, leaving high tension and an empty anterior chamber. The procedure is also indicated in secondary glaucoma and seems to have a beneficial influence on iridocyclitis; in hemorrhagic glaucoma it may be repeated without damage. How to avoid danger to the cornea, iris, lens, and vitreous is discussed in detail.

C. Zimmermann.

Vos, T. A. **Healed retinal detachment in hydrophthalmos.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 691-699. (See Section 10, Retina and vitreous.)

Waardenburg, P. J. **Observations on heredity in the borderline region between juvenile and senile glaucoma, as well as between infantile and juvenile glaucoma.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 662-686.

The author reports two families, several of whose members suffered from glaucoma. The pathologic processes of the involved eyes are described and compared. The clinical types of glaucoma occurring in these families are discussed and contrasted.

C. A. Perera and U. Ollendorff.

9

CRYSTALLINE LENS

Bakker, A. **Pathogenesis of galactose cataract.** Graefe's Arch., 1939, v. 140, pt. 3, pp. 531-542.

The author reviews the writings of previous workers who have dealt with the experimental production of galactose cataracts. He confirms Kirby's report that galactose has a direct toxic effect upon the lenses of rats in vitro. The changes in these lenses, however, were insignificant as compared with the cataractous changes found in vivo in rats fed a galactose diet. Such animals drank seven times as much water as control rats, and had a lowered serum calcium. The author concludes that something more than a local toxic effect is necessary for the development of galactose cataracts in living animals. He believes that the calcium metabolism plays a part. Attempts to hinder the formation of galactose-cataracts by the use of "AT 10" were inconclusive.

Charles A. Perera.

Cowan, A., and McDonald, R. **After-cataract.** Arch. of Ophth., 1939, v. 22, Dec., pp. 1074-1078; also Trans. Amer. Ophth. Soc., 1939, 37th mtg., p. 91.

This report is based on the biomicroscopic appearance of 218 eyes one or more years after extraction of senile cataract, with special reference to the late anatomic or pathologic changes in the aphakic eye. Some inflammation apparently takes place in every eye on which an intraocular operation is performed, and can be detected by corneal

precipitates, ruptures and folds in Descemet's membrane, endothelial dystrophy, cells in the aqueous, and organized exudates from the iris or vitreous. Rupture of the hyaloid membrane, prolapse of the vitreous, incarceration of the capsule or vitreous in the corneal wound, atrophy of the iris, and irregular, mutilated, or displaced pupils do not in themselves interfere with good vision. The authors emphasize that good vision does not always follow the best operative result. There seems to be no justification as far as usefulness or even appearance of the eye is concerned for doing a simple extraction, since in nearly every eye in which extraction was done without iridectomy the iris showed marked atrophy with a displaced and irregular pupil. After complete iridectomy, if the pupillary margin is free, the movements of the intact remaining border seem perfectly normal.

J. Hewitt Judd.

Dutt, K. C. **Extraction of subluxated lens by the lever-action intracapsular method.** Arch. of Ophth., 1939, v. 22, Nov., pp. 844-848.

A subluxated cataractous lens was successfully extracted by the author's method of lever action using the hyalonavicular fulcrum and the mango-leaf dislocator. The author advocates that this method be tried first since it is less violent than the other methods commonly used. J. Hewitt Judd.

Goldsmith, J. **Slitlamp observations during experimental intracapsular extraction of cataract.** Arch. of Ophth., 1939, v. 22, Nov., pp. 792-808.

Slitlamp observations of 18 intracapsular extractions performed with a modified Barraquer glass cannula on eyes enucleated four to six hours after death are the basis for a description of the anatomic relation of the zonule, ciliary body, lens, and hyaloid membrane. The findings are analyzed as to the nature of direct trauma to the ciliary epithelium, detachment of the ciliary body and anterior surface of the choroid, the process of rupture of the zonular fibers, the tendency toward production of tears in the hyaloid membrane and prolapse of the vitreous, and the predisposition to retinal detachment following occasional trauma to the base of the vitreous.

J. Hewitt Judd.

Hague, E. B. **A new ultraviolet lamp for cataract surgery.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 317-318.

Irvine, Rodman. **Exfoliation of the lens capsule (glaucoma capsularis).** Arch. of Ophth., 1940, v. 23, Jan., pp. 138-160.

Based on the study of the 40 cases reported and on a review of the literature the author concludes that senile exfoliation of the lens capsule is more prevalent than is generally recognized. It was found in 8 percent of 235 patients with cataract examined at the Government Ophthalmic Hospital in Madras, India, and in approximately 3 percent of patients with cataract seen in Los Angeles. The relation of senile exfoliation to chronic simple glaucoma is more significant than is generally believed. Fifty to 75 percent of eyes seen with exfoliation of the lens capsule have chronic simple glaucoma. There are insufficient data available for any statement as to the incidence of exfoliation in cases of chronic simple glaucoma, estimations varying from 5 to 93 percent. The theoretic considerations regarding the causation of glaucoma following exfoliation suggest certain modifications in the care of these patients worthy of attention. Clinical experience gives the impression that the oper-

ative prognosis is not as favorable in patients with exfoliation as in a similar group without exfoliation. (Discussion.) J. Hewitt Judd.

Joannides, T. **A case of superficial exfoliation of the anterior capsule with glaucoma capsularis of Vogt.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 169.

The author reports a case and reviews the theories on the etiology of the condition. The patient's mother had had one eye enucleated for absolute glaucoma, and there was a hole in the macula of her remaining eye.

George A. Filmer.

Karbacher, Paul. **Critical remarks on Johannes Seefried's work on the vitamin-C content of senile cataractous lenses.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 748-754.

The author believes that Seefried (Amer. Jour. Ophth., 1938, v. 21, p. 1059) did not adequately prove that patients with senile cataract suffer from a modification of the vitamin-C content of the lens and of the system generally, and that the number of cases presented by Seefried was too small for statistical conclusions.

C. A. Perera and U. Ollendorff.

Lauber, H. **The influence of opacities of the media upon the field of vision.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 687-690.

Cases in which opacities of the media affect the visual fields have been infrequently reported and discussed. The author describes two patients with chronic glaucoma and incipient cataracts. Following the removal of a cataractous lens from each patient, the visual field of the operated eyes showed great improvement attributable, according to the writer, to the removal of the lens opacities.

C. A. Perera and U. Ollendorff.

Legrand, M. **Cataract extraction in diabetics.** Bull. Soc. d'Opht. de Paris, 1938, June, p. 372.

The dangers associated with general operations on diabetics are based upon three things: (1) hyperglycemia favors suppuration, (2) arteriosclerosis may induce slow healing and necrosis, (3) acidosis may result from general anesthesia. In the case of cataract extraction, absence of shock, local anesthesia, and careful preoperative preparation of the patient reduce the risks of surgical intervention to a minimum. The author bases his report on the results of 67 cataract extractions in diabetics. In five cases healing was retarded. In eleven cases postoperative iritis occurred, all in cases of extracapsular extraction. The role of lens material in these cases of iritis appeared undeniable. The percentage of successful operations was about equal in diabetics and nondiabetics, 51 percent attaining visual acuity better than 7 percent in the former, and 57 percent in the latter. Partisans of intracapsular extraction may justly claim an advantage in diabetics, in which postoperative iritis is avoided and the extraction is almost always facilitated by a fragile zonule and a firm capsule which may be easily grasped. The author does not favor preliminary iridectomy. He concludes that capsulolenticular extraction with a small peripheral iridectomy affords the diabetic the best chance of success and the minimum of risk. Jerome B. Thomas.

Rubino, A. **A peculiar congenital opacity of the lens.** Boll. d'Ocul., 1939, v. 18, Jan., pp. 23-26.

By focal illumination a boy of 14 years showed a zone of opacity in the

deep layers of the left lens slightly below the central area. The opacity was roundish, thin, and web-like in appearance. Vision of this eye was 2/10. The writer is of the opinion that the opacity was a result of transitory circulatory disturbances in the posterior tunica vasculosa lentis. (4 figures.)

M. Lombardo.

Simonelli, M. **The relation of glucose metabolism to the pathogenesis and postoperative course of cataract.** Boll. d'Ocul., 1939, v. 18, Feb., pp. 103-128.

The results of the basal glycemia test in 97 patients affected by juvenile or senile cataract, and of the provoked hyperglycemia test in 32 of these patients are given in tabulated forms. These show that no pathogenetic connection exists between slight changes in glucose metabolism and cataract or any complication after cataract operation. (Bibliography.) M. Lombardo.

Tahinci, E. **A case of ophthalmomalacia following cataract extraction.** Türk Oft. Gazetesi, 1937, v. 2, pt. 6, p. 279. (French abstract: 1938, v. 2, pt. 9, p. 471.)

A man aged 57 years developed marked hypotony of the globe and reduction in vision two months after successful extraction of a senile cataract. No cause could be found except low blood pressure and mental shock. The author suggests injections of cerebrospinal fluid into the vitreous after the method of Bonnet and Paufique.

George H. Stine.

Trantas, A. **Senile exfoliation of the anterior capsule.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 226.

According to the author, exfoliation is primarily a senile manifestation, frequently associated with glaucoma, but capable of existing without provoking this condition. George A. Filmer.

Trantas, N. **Superficial striate coronary opacities of the lens.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 218.

These opacities were found in the anterior cortex of 75 percent of all patients examined. They occurred as terminations of bands coming from the periphery of the lens as a sort of suture, and were seen in young as well as old persons. George A. Filmer.

Tzanidès, T., Manoussis, S., and Moschos, N. **Intracapsular cataract extraction.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 172.

The authors report a series of cases and highly recommend this method of extraction. George A. Filmer.

Van der Hoeve, J. **The course of expulsive hemorrhage.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 655-661.

The author briefly discusses the subject of expulsive hemorrhage after perforation of the eyeball, with special reference to its occurrence following cataract extraction. The incidence of this complication is stated by different surgeons to be between one and twelve per thousand operations for cataract. It occurs in an equal proportion of instances after extracapsular and intracapsular operations, but is more common following the removal of complicated cataracts. The course of expulsive hemorrhage is described and illustrated by a number of excellent photomicrographs, several of which picture a retinal tear with blood extending through this into the vitreous cavity. The author obtained an eye in which a corneal ulcer perforated during enucleation. The intraocular hemor-

rhage which immediately started was stopped when the lens was partly extruded and plugged the perforation.

C. A. Perera and U. Ollendorff.

Yudkin, A. M., and Geer, H. A. **An investigation of experimental cataracts in the albino rat; clinical implications.** Arch. of Ophth., 1940, v. 23, Jan., pp. 28-40; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 99.

A résumé of the experimental investigation of galactose cataracts in laboratory animals is presented, showing that lenticular changes result from feeding lactose at high levels or galactose at lower levels. A low-protein ration hastens development of the opacities of the lens and a high-protein ration or a high intake of cystine tends to retard the pathologic change. Dinitrophenol given in large doses does not produce lenticular changes in animals, nor does it aid in the formation of cataract. Massive doses of riboflavin and liberal amounts of vitamin-B complex in the form of brewers' yeast powder exert no protective action against the development of galactose cataract in rats. When the experimental cataract is complete, no specific dietary factor or local medication has been found that will change it back to a transparent state. It is possible, however, to check the development of the lenticular changes by altering the diet.

J. Hewitt Judd.

10

RETINA AND VITREOUS

Bengisu, Naci. **A case of facial nevus associated with retinitis proliferans.** Türk Oft. Gazetesi, 1937, v. 2, pt. 5, p. 253. (French abstract: 1937, v. 2, pt. 8, p. 415.)

Bengisu describes a case of congenital nevus involving the left side of the face, the left eyelid, and the left ala of the nose, as well as the left side of the tongue and the palatine arch. There was congestion of the retinal veins, retinitis proliferans, and glaucomatous excavation of the disc.

George H. Stine.

Caussade, L., Thomas, C., Neimann, N., and Davidsohn, S. **Hemeralopia in induced hypovitaminosis A.** Bull. Soc. d'Opht. de Paris, 1938, May, p. 276.

The Committee on Hygiene of the League of Nations has included in its projects research on the subject of vitamin deficiency, the results to be used in planning the social hygiene of children of school age. For vitamin A it was logical to undertake a study of the ocular symptoms. The authors claim to have proof of the practical utility of a physiologic test of vitamin-A deficiency, having conducted upon a group of children a series of measurements of visual acuity with low illumination. This group of 25 children was hospitalized and placed on a diet designed to reduce the vitamin-A intake but at the same time to maintain an adequate diet from the standpoint of energy. Tests were made to determine light-threshold values. The experiment was conducted over a period of three months. It was observed that deficiency of vitamin A lowered the threshold of vision for low illumination and increase of vitamin A raised the threshold. No clinical changes in the subject were observed, there was no abnormal behavior in darkness which would suggest hemeralopia, and no precursory signs of xerophthalmia appeared. Figures illustrate strikingly the light-threshold curves in nine subjects reported.

Jerome B. Thomas.

Caussade, L., Thomas, C., Neimann, N., and Davidsohn, S. **Utilization of the hemeralopia test for detection of vitamin-A deficiency in children.** Bull. Soc. d'Opht. de Paris, 1938, June, p. 415.

At the preceding meeting of the Society an experimental study was reported (see above) of a group of children placed upon a régime which enabled the authors to follow with exactitude the variations in vitamin-A deficiency. The present report is concerned with a total of 210 children clinically free from vitamin-A deficiency, among whom were found 28 cases of latent hemeralopia. In all but one of these 28 cases the hemeralopia was overcome in a few days by the administration of vitamin A. The authors conclude that the test for hemeralopia submitted to practical trial confirms their original conclusions founded on experimental studies.

Jerome B. Thomas.

Dubois-Poulsen. **Angioscotometry in certain vascular affections of the retina.** Bull. Soc. d'Opht. de Paris, 1938, June, p. 325.

The author reviews the subject, beginning with the reports of Evans in 1926, and himself reports six cases chosen from hundreds of others to illustrate certain general characters. The lesion of a vessel registers itself by an enlargement of its normal scotoma. The shadow cast upon the sensory elements of the retina by the vessel itself does not explain all. In fact the size of the normal scotoma is disproportionate to the size of the vessel, and may be increased by compression of the eyeball, lowering the head, jugular compression, fear, or menstruation. At the same time the vessel itself may shrink or become narrower, demonstrating that the vessel alone is not the cause of the scotoma but something outside of it (perivascular lymphatics, according to Evans). In the author's opinion angioscotometry is more than a method of revealing the lesions of vessels. It is a veritable functional exploration of the exchanges taking place between the vessels and the tissues which they supply. It complements ophthalmoscopy, studying the effect of lesion on function by a method more delicate than the classic measurements of visual field and visual acuity.

Jerome B. Thomas.

Fallica, G. **Determination of volatile aromatic substances in the vitreous body of rabbits.** Boll. d'Ocul., 1939, v. 18, Jan., pp. 1-10.

General diseases like nephritis, pernicious anemia, and colitis show an increase in the phenols circulating in the blood, and these affections may present ocular manifestations of neuroretinitis, retinal hemorrhages, and vitreous opacities respectively. The writer wished to discover whether the substances could also be found in vitreous which was in direct contact with the affected membrane. The experiments were performed on rabbits. Findings presented in tabulated form show that these substances are present in both the vitreous and the blood of the same rabbit, the amount being lower in the vitreous. (Bibliography.)

M. Lombardo.

Gifford, S. R., and Cushman, B. **Certain retinopathies due to changes in the lamina vitrea.** Arch. of Ophth., 1940, v. 23, Jan., pp. 60-75; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 195.

The authors present and discuss the findings in 18 cases of retinopathy due to hyaline deposits in which there was

slight or only moderate loss of vision and in nine cases in which the occurrence of unusually dense hyaline deposits in both eyes was associated with the central disc-shaped retinopathy of Kuhnt and Junius in one or in both eyes. As a third type, a case of angioid streaks is reported associated with central retinopathy and hyaline deposits. Hyaline deposits of the lamina vitrea or drusen, may, when especially large or densely packed, cause a form of central retinopathy. The visual damage is due apparently to pressure on the rods and cones or to slight changes in their locations and hence is usually much less than that due to primary cystic degeneration of the retina. The picture is the same whether it occurs in the hereditory form known as Tay's or Doyne's guttate choroiditis or in the form affecting isolated members of a family. The conception of a senile or presenile degeneration of the membrane fitting into Treacher Collins' group of abiotrophies seems to explain the condition as well as any other. Such deposits are to be distinguished from Gunn's dots which are located in the inner layers of the retina and cause no visual disturbance. Dense aggregations of hyaline deposits in the macular area are associated with central disc-shaped retinopathy in a larger proportion of cases than is explicable by mere coincidence. This association is taken to indicate one manifestation of more extensive degenerative changes in the lamina vitrea which seem to form the most important cause of the changes observed clinically. The various conditions are illustrated by fundus photographs. J. Hewitt Judd.

Hardy, Guerdan. **Deafness and retinitis pigmentosa.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 315-317.

Igersheimer, J. **Regarding the Laurence-Biedl syndrome.** Türk Oft. Gazetesi, 1936, v. 2, pt. 3, p. 117. (French abstract: 1937, v. 2, pt. 5, p. 273.)

Six cases are reported in detail: atypical retinitis pigmentosa, fatty dystrophy, mental retardation, and various malformations. (Bibliography.)
George H. Stine.

Jeandelize, P., and Drouet, P. L. **The hypophysis and retinal vascular pressure.** Bull. Soc. d'Opht. de Paris, 1938, May, p. 286.

In certain endocrine syndromes where a hypophyseal lesion is suspected, the retinal veins may become congested, more or less dilated and tortuous, and may even be accompanied by papillary edema. The authors believe that pressure of the gland on the coronary and cavernous sinuses may favor a stasis visible in the retinal veins. In the pathogenesis of retinal circulatory hypertension a lesion of the pituitary gland may be responsible under certain conditions. This hypertension is often associated with slight contractions of the visual field. It constitutes a valuable sign which should be systematically investigated together with the other ocular signs.
Jerome B. Thomas.

Lijo Pavia, J. **Arterial hypertension.** Rev. Oto-Neuro-Oft., 1939, v. 14, Feb., p. 41.

A discussion of the ocular signs and symptoms of arterial hypertension with special stress on the value of tonoscopy and colored cinematography as diagnostic adjuncts. (Illustrated.)
Edward P. Burch.

McDonald, R., and Adler, F. H. **Effect of anoxemia on the dark adaptation of the normal and of the vitamin-**

A-deficient subject. Arch. of Ophth., 1939, v. 22, Dec., pp. 980-988; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 368.

When anoxemia was produced experimentally, it was found that the rod and cone thresholds were raised in equal degree, but the rate of adaptation was apparently unchanged. When dietary intake of vitamin A was reduced, an unequal rise in rod and cone threshold was caused, the rod threshold showing the greater variation. The rise in threshold due to anoxemia is simply additive, and is the same in the normal condition and in vitamin-A deficiency. Since it is known that vitamin A is concerned with the photochemical basis of the visual response, and since the two processes produce dissimilar results, it is likely that the anoxemia acts elsewhere in the visual system, probably on the nerve mechanism. (Discussion.) J. Hewitt Judd.

McFarland, R. A., and Evans, J. N. **Alterations in dark adaptation under reduced oxygen tensions.** Amer. Jour. Physiology, 1939, v. 127, Aug. 1, p. 37.

The authors measured the phenomena of the darkening of the visual field under anoxia by the usual procedures of studying night blindness. Their erperiments suggest that the changes are not concerned with the photochemical substances of the retina but with the neural elements of both the retina and the central nervous system.

Theodore M. Shapira.

Machemer, H. **Treatment of detachment of the retina with electrolysis.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 561.

Machemer describes in detail his method and results with two-pole electrolysis. Three kinds of application proved clinically successful: surface electrolysis, perforation electrolysis with anode and cathode, and a combination of both. Electrolysis is a simple, reliable, and effectual method for the treatment of detachment of the retina. C. Zimmermann.

Nicolacopoulos, J. **Embolism of the inferior branch of the central retinal artery with the embolus visible.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 140.

The artery on the surface of the disc presented a yellowish-white rounded swelling at the site of the embolus.

George A. Filmer.

Pischel, D. K., and Miller, M. **Retinal detachment cured by an eyeball-shortening operation.** Arch. of Ophth., 1939, v. 22, Dec., pp. 974-979.

Lindner's eyeball-shortening operation is briefly reviewed and one case in which this procedure was used is reported. It resulted in complete reattachment of the retina, with great improvement of vision and restoration of a normal visual field. The procedure is well illustrated by drawings.

J. Hewitt Judd.

Rötth, A. de. **Bilateral detachment of the retina; a heredodegenerative disease.** Arch. of Ophth., 1939, v. 22, Nov., pp. 809-831. (See Amer. Jour. Ophth., 1940, v. 23, March, p. 348.)

Salzmann, Maximilian. **Prepapillary proliferation of connective tissue in glaucoma, and its relation to retinitis proliferans.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 629-654. (See Section 8, Glaucoma and ocular tension.)

Sandoz, Y. L. **Bilateral histologic findings in senile pseudotumor of the**

macula; a new conception of this change. Graefe's Arch., 1939, v. 140, pt. 4, pp. 725-747.

The author presents a thorough historical survey of senile pseudotumor of the macula, with a review of the histologic studies made by previous writers. The condition must be considered as distinct from other types of macular disease, and as more likely to be mistaken for a malignant tumor. Careful histologic studies of the two eyes of a patient with bilateral senile pseudotumor of the macula are reported, and several photomicrographs displayed. The pseudotumor was found between the retina and the lamina vitrea, and consisted of a collagenous fibrous tissue. Vogt and the author were able to demonstrate perforations of the lamina vitrea. There was a reticular tissue, rich in capillaries, which grew through these gaps into the pseudotumor. These findings prove the mesodermal origin of the lesion and disprove the opinion of many workers that the pseudotumor is formed from metaplasia of the pigment epithelium. The author believes that the condition is due to a primary, perhaps hereditary, disease of the choriocapillaris in the region of the macula.

C. A. Perera and U. Ollendorff.

Schaffer, Karl. **The eyeground in the three types of familial idiocy.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 602; also Szemeszet, 1939, v. 2, Dec., p. 3. (See Amer. Jour. Ophth., 1940, v. 23, Jan., p. 108.)

Sezer, Necdet. **Acetylcholine in embolism of the central retinal artery.** Türk Oft. Gazetesi, 1937, v. 2, pt. 7, p. 342. (French abstract., 1938, v. 2, pt. 9, p. 475.)

In a case of embolism of the central retinal artery the use of acetylcholine by injection (0.10 cg.) restored the retinal circulation in 24 hours, and normal vision was finally recovered. The dose recommended is 0.10 cg. every day or two.

George H. Stine.

Vos, T. A. **Healed retinal detachment in hydrophthalmos.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 691-699.

The author presents a most interesting case history of a 38-year-old man with compensated hydrophthalmos involving his left eye. Both eyes had been operated upon in childhood on several occasions. The right eye was removed following an injury in 1909. Five years later, the patient's left eye was struck by a piece of wood and this injury caused an iridodialysis above and temporally. Seventeen years after this injury a detachment of the temporal retina appeared. This reattached spontaneously with rest in bed as the only form of treatment. The retinal separation and reattachment recurred on five subsequent occasions from 1932 to 1937. The patient was seen shortly thereafter with a recurrence of the detachment; a small hole was found in the peripheral retina in the upper outer quadrant. The hole was closed by diathermic coagulation, with reattachment of the retina and restoration of the visual field. The writer discusses the problems which arose in this patient and the question of spontaneous cure of hydrophthalmos.

C. A. Perera and U. Ollendorff.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Baydur, C. S. **The optochiasmatic arachnoiditides, their diagnosis and indications of treatment.** Türk Oft. Gaze-

tesi, 1937, v. 2, pt. 6, p. 287. (French abstract: 1938, v. 2, pt. 9, p. 472.)

The author is convinced that the diagnostic points and treatment of optochiasmatic arachnoiditis are now well established and that these patients should be referred to the neurosurgeon before blindness due to optic atrophy sets in. Three types of pathology are found: (1) true arachnoiditis with traction, (2) serous meningitis, and (3) gray optic atrophy without arachnoid traction or meningitis. The differential diagnosis, etiology, and treatment are discussed. George H. Stine.

Drouet, P. L., and Thomas, C. **Edematous appearance of the papilla in endocrine states.** Bull. Soc. d'Opht. de Paris, 1939, June, p. 393.

Ten cases are reported in brief detail, all of them presenting pathologic phenomena in which endocrine disturbance had a large part, and all of them presenting different degrees of edema of the papilla. The edema was sometimes bilateral, sometimes unilateral, and was characterized by a haze surrounding the papilla or limited to the nasal segment. The appearance resembled that of the pseudoneuritis of hypermetropia but only one of the reported cases was pathologically hyperopic. The cases under consideration included hyperthyroidism, hypothyroidism, tumor of the hypophysis, and menopause, both natural and by castration. The question posed is whether the hypophysis may not have a part in causing this edema. Such a hypothesis seems likely when one considers the normal and the pathologic relations which may exist between the pituitary gland and the arteriovenous circulation of the eye by means of the internal carotid and the cavernous sinus. The importance of this edema appears not to reside in the prognosis, which is good in spite of persistence or of resistance of the edema to irradiation of the hypophysis, but it should be thoroughly investigated.

Jerome B. Thomas.

Glees, M. **Observations on so-called lactation neuritis.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 615.

Three cases of disease of the optic nerve during lactation are described. The first occurred 11 weeks after labor and five weeks after weaning, the second 4 weeks after labor and while still nursing the child, and the third 6 weeks after labor and while still nursing. Vision was very much diminished, but complete recovery occurred in the first two cases and improvement in the third. All three terminated in simple atrophy of the optic nerve with relatively little functional disturbance, and without objective general findings. Two showed tortuous retinal arteries and edema of the retina around the disc and along the large vessels. The vascular changes seemed to be of etiologic importance, but the cause of their development during lactation was not explained. Debility during gravidity, labor, and the puerperium may predispose to infection with damage to the optic nerve.

C. Zimmermann.

Gözberk, R. A. **Congenital atrophy of the optic nerve of heredosyphilitic origin.** Türk Oft. Gazetesi, 1936, v. 2, pt. 1, p. 36. (French abstract: 1936, v. 2, pt. 3, p. 176.)

The author reports the cases of two brothers, both blind, the parents of whom had strongly positive Wassermanns. The elder brother, aged twelve years, showed primary optic atrophy, sluggish pupillary reactions, and a rotatory nystagmus. He had an olympian

forehead. The Wassermann was strongly positive. The younger brother, aged three years, had an eczematous skin eruption which did not respond to local treatment. He showed horizontal nystagmus, paretic pupils, and optic atrophy. The Wassermann was strongly positive. As to the pathogenesis of the optic atrophy, the author considered internal hydrocephalus, chronic meningitis, and faulty development of the optic nerve. George H. Stine.

Griffith, J. Q., Jr., Fry, W. E., and McGuinness, A. **Experimental and clinical studies in hydrocephalus.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 245-251.

Hagedoorn, A. **Deficiency diseases of the ocular nerves.** Graefe's Arch., 1939, v. 140, pt. 3, pp. 561-587.

Disease of the optic nerve has the significance of possible danger to the central nervous system or of an associated involvement of this system. A deficiency disease of the optic nerve may be due to insufficient diet, poor utilization of the ingested food, excessive consumption of certain hormonal and dietary factors, or other causes. Pernicious anemia is discussed, the author stating that retrobulbar neuritis may be the first sign of this disease. The part which dietary deficiencies play in alcohol-tobacco amblyopia and pellagra is reviewed. A case of diabetes with retrobulbar neuritis and disease of the central nervous system is reported. The scientific literature dealing with the causes of nerve diseases in diabetes is reviewed. Arteriosclerosis, acidosis, hyperglycemia, avitaminosis, and other conditions have been presented as factors. In the writer's opinion, arteriosclerosis as an etiologic significance is inadequately sustained in the literature. He attributes the retrobulbar neuritis in his case to a disturbance in the absorption and utilization of those substances which are necessary to the maintenance of the functional integrity of the nervous system.

C. A. Perera and U. Ollendorff.

Hermann, P. **Leber's disease.** Arch. d'Opht., etc., 1939-1940, v. 3, no. 9, p. 784.

A study of a family tree presenting seven cases (one female) is reported. A man married two cousins who were carriers. A daughter by his first wife was affected as were two sons by his second. A son of the affected female and three grandsons of a sister of the first wife were tainted. The author discusses the sex linkage of the disease, its mode and time of onset. One of the cases had a craniotomy which disclosed adherent chiasmic-arachnoiditis. Five similar cases were found in the literature. The author believes that there exists a congenital optic-nerve debility and the exciting cause may be: (1) delayed ossification of the sphenoid, (2) endocrine dyscrasia, (3) intoxication, or (4) inflammation of the chiasm. (Bibliography.) Derrick Vail.

Knapp, Arnold. **Course in certain cases of atrophy of the optic nerve with cupping and low tension.** Arch. of Ophth., 1940, v. 23, Jan., pp. 41-47; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 300.

In the eleven cases reported there were cupping of the atrophic optic disc and low ocular tension associated with visual-field changes which were not common to glaucoma and which remained stationary for a long time. In these cases an operation is of questionable benefit. The slow, if not station-

ary, course is especially characteristic in the group with altitudinal defects. Descending atrophy can be a compression product in hypophyseal tumor only when the chiasm is stretched and compressed. Atheromatous carotid arteries cannot alone cause this descending atrophy, but there must be simultaneous circulatory disturbances in the optic nerve from arteriosclerotic vascular changes. The roentgenographic demonstration of a calcification of the basal vessels cannot be regarded as proof of compression of the optic nerve but suggests vascular disturbances in the nutritional vessels of the optic nerves. J. Hewitt Judd.

Sourdille, G. P. **Difficulty of prognosis and necessity of examination in cases of retrobulbar neuritis.** Bull. Soc. d'Opht. de Paris, 1938, June, p. 401.

The classic textbooks give an imperfect idea of the multiplicity of causes of so-called retrobulbar neuritis, a term which is equally bad from the point of view of the anatomist and the clinician. The author reports two cases in proof of his contention that cases of retrobulbar neuritis should be carefully studied with perimeter and stereocampimeter with the coöperation of the neurologist. One patient proved to have serous meningitis associated with encephalitis. The other, who was a syphilitic and alcoholic, owed his eye symptoms to compression of the optic nerve by bands of arachnoiditis. One must not await too long the spontaneous cure of retrobulbar neuritis, but must intervene early, following a painstaking examination of all possible causes. Jerome B. Thomas.

Sourdille, G. P., and David, M. **Oxycephaly and alterations of the optic nerve.** Bull. Soc. d'Opht. de Paris, 1938, May, p. 206.

The authors report a case of oxycephaly in a child of seven years with atrophied discs, concentric contraction of the visual fields, and rapid failure of visual acuity. A decompressive trephining of the right subtemporal region was performed, and a large amount of liquid under pressure escaped on incision of the dura. At the end of six weeks the vision of the right eye had risen from 2/10 to 4/10, but there was no change in the vision of the left eye. The simple operation of trephining was chosen rather than the more complicated and serious resection of the superior wall of the optic canal, because symptoms and radiograms failed to present convincing evidence as to the direct cause of the pressure on the optic nerves. (Illustrations.)
Jerome B. Thomas.

Zavalia, A. U., and Oliva, R. O. **The symptomatology of papilledema.** Arch. de Oft. de Buenos Aires., 1939, v. 14, Feb., p. 152.

This is a descriptive treatise on the subjective and objective signs of papilledema. The authors outline in considerable detail the nerve-head changes from the incipient stage to ultimate secondary atrophy of the optic nerve. The advantage of ophthalmoscopy with the binocular instrument is stressed and the evolution of choked disc is admirably documented by photographic studies. Edward P. Burch.

12

VISUAL TRACTS AND CENTERS

Eversheim, H. J. **Bilateral hemianopsia as an ante-mortem symptom of septic general infection.** Klin. M. f. Augenh., 1940, v. 104, Jan., p. 77.

Following labor a girl of 24 years developed a bilateral mastitis which in spite of broad incision became rapidly septic and caused her death two weeks later. On the day before her death she had developed a bilateral hemianopsia. Autopsy revealed a picture of severe puerperal sepsis with disseminated abscesses in the liver, kidneys, and pelvic organs. The gray and white cerebral substances were permeated by small and large hemorrhages with abundant abscesses bulging under the pia mater.

C. Zimmermann.

Gözberk, Rifat. **Tumor of Rathke's pouch.** Türk Oft. Gazetesi, 1936, v. 2, pt. 2, p. 51. (French abstract: 1936, v. 2, pt. 4, p. 229.)

This case showed left homonymous hemianopsia. There were exaggerated reflexes, psychic disturbances, and drowsiness, but no polyuria or polydipsia. Deep radiation therapy caused considerable improvement in all symptoms.

George H. Stine.

Lobeck, E. **Significance of ocular findings in the diagnosis and treatment of brain tumors.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 599-628.

The author selected a group of cases in which the ocular findings were of value in the diagnosis and localization of brain tumors. He reports on three patients with tumor of the anterior cranial fossa, and discusses at length the Foster-Kennedy syndrome (optic-nerve atrophy with central scotoma on the side of the tumor, and papill-edema on the opposite side). One of the patients had bilateral choked disc and bilateral central scotoma, indicating a tumor extending into both cerebral hemispheres. The writer believes that the central field defects in these instances were due to pressure and to the anatomic position of the papillomacular fibers. The cases of six patients with intrasellar and suprasellar tumors are described. In two patients with syphilis, the ocular examination pointed to the correct diagnosis, although the symptoms and general examination were suggestive of brain tumor. Lastly, three cases in which the ocular findings were not necessary for the diagnosis and localization of a brain tumor are briefly reported.

C. A. Perera and U. Ollendorff.

Walsh, F. B., and Goldberg, H. K. **Blindness due to air embolism: complication of extrapleural pneumolysis.** Jour. Amer. Med. Assoc., 1940, v. 114, Feb. 24, p. 654.

Two cases of air embolism as a complication of extrapleural pneumolysis are reported. The onset of blindness was sudden and endured for three days. The vision improved gradually and within two weeks had become completely normal. The appearance of air in retinal vessels is a pathognomonic sign of air embolism, but this sign is so transitory that it is rarely seen, nor was it seen in these cases. Blindness is the most important ocular finding. The prognosis for return of vision is good for patients who survive.

George H. Stine.

13

EYEBALL AND ORBIT

Charamis, J. S. **Dysostosis craniofacialis.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 168.

Report of a typical case of Crouzon's disease.

George A. Filmer.

Kreibig, Wilhelm. **Bilateral metastatic ophthalmia from blastomycetes.** Klin. M. f. Augenh., 1940, v. 104, Jan., p. 64.

Kreibig reports a case of bilateral metastatic ophthalmia which developed in a woman of 37 years during the course of a fatal blastomycosis of the skin and internal organs. Histologic examination showed destruction of the ciliary processes. C. Zimmermann.

McNair, S. S. **Exophthalmos, without pulsation, due to arteriovenous aneurysm,** Arch. of Ophth., 1940, v. 23, Jan., pp. 22-27.

The author reviews the literature and reports the case of a woman aged 65 years, who presented extreme exophthalmos, complete external ophthalmoplegia, acute glaucoma, ulcer of the cornea, complete peripheral paralysis of the facial nerve, and complete blindness. She presented all of the cardinal signs of an aneurysm between the internal carotid artery and the cavernous sinus except pulsation. It is thought that ligation of the internal carotid artery of the affected side, with subsequent ligation of several branches of the external carotid artery of the same side if necessary, is the safest and most satisfactory form of treatment.

J. Hewitt Judd.

14

EYELIDS AND LACRIMAL APPARATUS

Faulkner, S. H. **Familial ptosis with ophthalmoplegia externa starting in adult life.** Brit. Med. Jour., 1939, Oct. 28, p. 854.

Five cases of ophthalmoplegia with ptosis occurred in two generations—a father and two sons and two daughters. One of the daughters developed ptosis as a child but the others were normal until about thirty years of age. There was some variation in the ophthalmoplegia but in no case were the intrinsic muscles affected. John C. Long.

Fazakas, Alexander. **Fungi in the lacrimal canaliculi, eyelids, and ciliary margins.** Klin. M. f. Augenh., 1940, v. 104, Jan., p. 59.

Fazakas enumerates the different kinds of fungi he has found in the lacrimal canaliculi, and which secondarily caused conjunctivitis, canaliculitis, and inflammation of the cornea. He dilates the punctum and canaliculus, removes the contents, epilates the lashes, and later applies iodine or silver-nitrate solution.

C. Zimmermann.

Fazakas, Alexander. **Ptosis operation with large tarsus and preserved function of the levator.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 621.

In two cases of ptosis caused by too large a tarsus, excision of a portion of the tarsal plate effected a cure.

C. Zimmermann.

Fazakas, Sandor. **Indirect constriction of the lacrimal duct in connection with 319 cases.** Orvosi Hetilap, 1940, v. 84, Jan., p. 6.

The author distinguishes direct and indirect constriction of the tear ducts. The former occurs more frequently (about 80 percent of the cases). The duct is spasmodically contracted over most of its length and does not need treatment. The condition disappears if a drop of adrenalin is instilled into the conjunctival sac. Probing the tear sac is harmful for it may lead to scar formation and may increase the spasm. The indirect constrictions are due to cicatrices in the duct. This type must be probed to overcome the constriction. Probing a few times with numbers 1 to 4 Bowman sounds will suffice.

R. Grunfeld.

Gözberk, R. A. **The palpebral manifestations of late heredosyphilis.** Türk Oft. Gazetesi, 1936, v. 2, pt. 3, p. 133. (French abstract: 1937, v. 2, pt. 5, p. 275.)

The first case is that of a boy of eleven years who had extensive ulceration of the conjunctiva, the upper lid, the root of the nose, and a large portion of the cheek. There was destruction of three fourths of the upper lid and no trace of the lower lid remained. Under treatment the ulcerations completely healed. The second case is that of a man aged thirty years. He had had severe ulcerations at the age of twelve years and had responded to injections of neosalvarsan. George H. Stine.

Gözberk, Rifat. **A case of staphylococcic septicemia following meibomitis.** Türk Oft. Gazetesi, 1937, v. 2, pt. 5, p. 240. (French abstract: 1937, v. 8, p. 413.)

A child aged eleven years developed severe multiple internal hordeola of the upper lid a month after the measles. The infection extended into the orbit necessitating orbital incisions. Meningitis developed and the child died. Autogenous vaccines of the staphylococcic pus were used in the treatment. Autopsy showed pyemia. (Bibliography.) George H. Stine.

Mineev, P. **Modification of the Millengen-Sapeshko operation.** Viestnik Opht., 1939, v. 15, pt. 2, p. 40.

The author excises a wedge-shaped segment of the tarsus and the roots of the misplaced cilia. The transplant is sutured in such a manner that the desired separation of the two segments of the lid is assured. Warm saline compresses are applied postoperatively to stimulate the taking of the transplant. The author considers this the most effective operation for trichiasis.

Ray K. Daily.

Nazarov, V. V. **Gumma of the lids.** Viestnik Opht., 1939, v. 15, pt. 2, p. 86.

Report of a case with involvement of the tarsus and tarso-orbital fascia. Slow healing followed antiluetic therapy.

Ray K. Daily.

Schumacher, C. L. **Instrument for simplification in applying the sutures in operations on the tear sac.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 629.

A catheter-like probe encloses a wire which can be protruded for catching the suture in Toti's operation. (Illustration.) C. Zimmermann.

Tolun, Kemal. **A case of congenital palpebral coloboma.** Türk Oft. Gazetesi, 1937, v. 2, pt. 7, p. 335. (French abstract: 1938, v. 2, pt. 9, p. 474.)

The patient showed a coloboma of the middle of the right upper lid and symblepharon at the same level. The cornea was vascularized and covered by a fleshy membrane. The left eye showed posterior synechiae and patches of peripheral choroiditis. Also present were nasal malformations, and verrucous excrescences on the face and right tragus. The blood Wassermann was positive. George H. Stine.

Treister, G. H. **Roentgenotherapy of epiphora.** Viestnik Opht., 1939, v. 15, pt. 2, p. 30.

Forty-seven patients with stenosis of the nasolacrimal duct and epiphora were treated by X-ray applications to the lacrimal gland. During a period of observation lasting over 18 months, 18 patients remained free of epiphora, 15 had slight epiphora in cold and wind,

8 had recurrences within six months to one year, and 6 had recurrences following a brief period of improvement. The author attributes the effect to the action of the X rays on the innervation of the lacrimal gland.

Ray K. Daily.

Vasilieva, H. A. **The data of the Turkmen Trachoma Institute on Barg's operation.** Viestnik Opht., 1939, v. 15, pt. 2, p. 46.

On the basis of one hundred operations the author considers this the most rational and satisfactory procedure for post-trachomatous trichiasis.

Ray K. Daily.

Reh, Hildegard. **A case of congenital fistulae of the oculonasal groove, combined with congenital aural fistulae and anosmia.** Klin. M. f. Augenh., 1940, v. 104, Jan., p. 55.

These conditions were incidentally observed in two women of 53 and 50 years of age respectively. They indicate a developmental abnormality in the germ plasm occurring between the 30th and 38th days of embryonic life.

C. Zimmermann.

15

TUMORS

Aléxiadès, S. **A case of sarcoma of the choroid in the macular region, diagnosed early.** Türk Oft. Gazetesi, 1936, v. 2, pt. 1, p. 18. (French abstract: 1936, v. 2, pt. 3, p. 173.

A small tumor occupying the macular region in a patient aged 28 years proved upon pathologic examination to be a primary sarcoma of the choroid.

George H. Stine.

Bengisu, Naci. **A case of palpebral elephantiasis with invasion of the sella turcica and atrophic excavation of the papilla without increased intraocular tension.** Türk Oft. Gazetesi, 1936, v. 2, pt. 2, p. 60. (French abstract: 1936, v. 2, pt. 4, p. 231.)

A man aged forty years had had a lobulated tumor of the entire upper lid of the left eye since he was eight years of age. The mass extended into the frontal and malar regions of the same side and there was slight exophthalmos. Incontrollable hemorrhage caused the surgeon to postpone operation.

George H. Stine.

Bengisu, Naci. **Palpebral tumor resembling lymphogranulomatosis and cured by radiation therapy.** Türk Oft. Gazetesi, 1936, v. 2, pt. 1, p. 30. (French abstract: 1936, v. 2, pt. 3, p. 177.)

This is a case of a coachman who had a tumor of the right upper lid following a fall. The tumor was cartilaginous in consistency and the size of a small egg; the skin of the lid was adherent to it and was a violaceous red. The eye itself was normal. Biopsy showed the mass to contain a serous fluid with polynuclear leucocytes and some epithelial cells, but no organisms. The general physical examination revealed no sign of lymphogranulomatosis. The lesion disappeared completely following radiation therapy.

George H. Stine.

Davis, F. A. **Plexiform neurofibromatosis (Recklinghausen's disease) of orbit and globe with associated glioma of the optic nerve and brain.** Arch. of Ophth., 1939, v. 22, Nov., 761-791; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 250.

A case of plexiform neurofibromatosis of the orbit and globe associated with glioma of the optic nerve is reported in detail. The lesions involved most of the nerves of the orbit as well

as those of the sclera, choroid, ciliary body, and iris. A gliomatosis of the intracranial portion of both optic nerves, the chiasm, thalamus, medulla, and pons, and a glioma of the temporal lobe of the brain were present. A few cutaneous "café-au-lait" (coffee and milk) pigmented patches, distributed over the trunk and extremities, were the only peripheral lesions. Similar pigmentary lesions were found in the skin of the patient's mother. The article is illustrated by photographs and photomicrographs. (Discussion.)

J. Hewitt Judd.

Gandolfi, C. **New growths in the prelacrimal-sac region.** Rassegna Ital. d'Ottal., 1939, v. 8, Sept.-Oct., p. 561.

Tumor formations lying in front of the lacrimal sac frequently have no connection with that structure. Such swellings may be neoplastic, inflammatory, or degenerative. Three cases are reported with microscopic findings, the first being a sebaceous cyst, and the second a granulomatous new growth containing many giant cells. The third case began as an acute inflammatory process which was incised, with the liberation of pus. After healing had taken place the indurated area was excised and proved to be a subcutaneous inflammatory mass not connected with the lacrimal sac. (6 figures.)

Eugene M. Blake.

Gözberk, R. A. **A case of sarcoma of the choroid.** Türk Oft. Gazetesi, 1936, v. 2, pt. 1, p. 14. (French abstract: 1936, v. 2, pt. 3, p. 172.)

In a case of acute secondary glaucoma of twenty months duration a diagnosis of sarcoma of the choroid was made by microscopic examination of the enucleated eye.

George H. Stine.

Gözcü, Niyazi. **Cavernous angioma of the orbit.** Türk Oft. Gazetesi, 1936, v. 2, pt. 4., p. 179. (French abstract: 1937, v. 2, pt. 6, p. 328.)

The author reports the case of a man aged 38 years, who had a reducible exophthalmos and progressive loss of vision of the right eye. There was severe pain on the same side radiating to the teeth. A soft vermicular mass was palpated through the outer portion of the lids. The ocular movements were normal. Fundus examination showed dilated retinal veins and papilledema. The Wassermann, Cazoni, and Weinberg reactions were negative. The tumor was completely extirpated by the method of Krönlein following which the ocular symptoms subsided. Vision returned to 0.1. The author states that he has seen only two similar cases in his hospital service of nineteen years. George H. Stine.

Igersheimer, J. **Benign and malignant superficial neoplasms of the globe.** Türk Oft. Gazetesi, 1937, v. 2, pt. 5, p. 245. (French abstract: 1937, v. 2, pt. 8, p. 411.)

Four cases are reported of new growths involving the epithelium of the globe. The first case was a papilloma of the pavement epithelium, the second case a carcinoma in which exenteration of the orbit became necessary, the third case a benign papilloma, and the fourth case a carcinoma. George H. Stine.

Koke, M. P., and Braley, A. E. **Bilateral plexiform neuromata of the conjunctiva and medullated corneal nerves.** Amer. Jour. Ophth., 1940, v. 23, Feb., pp. 179-182.

Meisenbach, A. E., Jr. **Hemangioma of the orbit.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 286-295.

Rasi, F., and Grandi, G. **Chloroma of the orbit.** Boll. d'Ocul., 1939, v. 18, Feb., pp. 84-102.

A month after the beginning of symptoms a girl of three years showed bilateral exophthalmos with periorbital swelling which appeared to be of a greenish color, edema of the papilla, and bilateral retinal hemorrhages. Radiographic examination disclosed diastasis of the cranial sutures and thinning of the orbital walls. Palpation revealed the presence of masses of tissue adherent to the underlying bone. Biopsy of a lymphatic gland showed proliferation of myeloid tissue, and radiotherapy effected temporary reduction of the tumor masses. (Bibliography.) M. Lombardo.

Sezer, F. N. **Adenocarcinoma of meibomian gland.** Türk Oft. Gazetesi, 1937, v. 2, pt. 4, p. 191. (French abstract: 1937, v. 2, pt. 6, p. 330.)

A man of 71 years presented a tumor on the temporal side of the left inferior eyelid. The tumor was removed radically and pathologic examination revealed it to be adenocarcinoma of the meibomian gland, of sebaceous origin and strictly of the eyelid.

George H. Stine.

Skrinchenko, S. P. **Carcinoma of the meibomian glands.** Viestnik Opht., 1939, v. 15, pt. 2, p. 93.

A report of a case, with detailed microscopic description. Carcinoma of the meibomian glands is easily confused with chalazion, and the author advises microscopic examination of chalazia in people over 40 years of age. This case was treated by excision of the lid, a plastic flap from the cheek, and subsequent X-ray irradiation of the lid and regional glands. The globulin fraction of the blood plasma was found much increased. After excision of the neoplasm it returned to normal. (Photographs.) Ray K. Daily.

Terry, T. L. **Malignant melanoma—so-called sarcoma—of uvea. 2. Problems in diagnosis.** Arch. of Ophth., 1939, v. 22, Dec., pp. 989-1022; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1939, 90th mtg.

Mistakes in diagnosis in this condition are due either to failure to discover the presence of the tumor or to confusion of some other pathologic condition with malignant melanoma. However, failure to remove an eye containing a malignant melanoma is a greater mistake than removal of an eye erroneously thought to contain a neoplasm. A variety of disease conditions often hide malignant melanoma of the ciliary body and choroid, and, therefore, it should be suspected in every instance of unilateral glaucoma, separation of the retina, iridocyclitis, and endophthalmitis. All painful blind eyes should be enucleated because they may contain malignant melanomas. This tumor has simulated disciform degeneration of the macula, localized inflammatory tumors of the choroid, spontaneous separation of the choroid, subchoroidal hemorrhage, localized melanosis oculi, angioma, benign melanoma, metastatic carcinoma, metastatic chorioepithelioma, retinoblastoma, and neurofibroma. The points in differential diagnosis are discussed by the author. Mistakes in transillumination are often due to improper placing of the light or too large and too bright a source of light. A general physical examination for evidence of metastasis and a test for melanuria are important aids in diagnosis. Various points in the paper are illustrated by

the 13 cases reported in detail. (Photomicrographs, discussion.)

J. Hewitt Judd.

Uhler, E. M. **Metastatic malignant melanoma of the retina.** Amer. Jour. Ophth., 1940, v. 23, Feb., pp. 158-162.

Wagner, Fredrich. **Contribution to the question of primary glioma of the optic nerve.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 606.

Two and one-half years previously a girl of five years had developed moderate exophthalmos of the left eye. The retina showed a tumor-like bulging, several ill-defined small foci, one larger focus, and small preretinal hemorrhages. Roentgen examination showed enlargement of the left optic foramen. The child died 12 days after admission to the hospital. A tumor of the optic nerve was found to have spread around the disc and to have caused shrinking of the central portion of the nerve. A diagnosis of primary glioma of the optic nerve with no intracranial extension was confirmed histologically. According to the investigations of numerous authors, a large number of so-called myxomas, myxosarcomas, and fibrosarcomas originate in the nervous supporting substances and are really gliomas.

C. Zimmermann.

Weinberger, L. M., and Grant, F. C. **Visual hallucinations and their neuro-optical correlates.** Arch. of Ophth., 1940, v. 23, Jan., pp. 166-199.

Sixteen cases of visual hallucinations occurring in association with tumors compressing the optic nerves and chiasm are reported. The visual phenomena are analyzed in respect to the organization of the images and to the relation between the portions of the field in which the hallucinations are subjectively experienced and the portions of the fields which are objectively blind. The study of the cases in the literature as well as those reported here leads the authors to conclude that: visual hallucinations in themselves have no localizing value whatever in focal diagnosis; visual hallucinations may be provoked by lesions at any level of the neuro-optic apparatus; visual hallucinations are not due to local cortical excitability but are psychologic phenomena, involving the total integrative activities of the mind; the complexity of the images depends on psychologic and constitutional factors and not on cortical psychic organization; and there is no constant relation between the portion of the field into which the hallucinations are projected and the objectively blind areas.

J. Hewitt Judd.

16

INJURIES

Alvaro, M. E. **Importance of the angle delta in localizing intraocular foreign bodies.** Arch. of Ophth., 1939, v. 22, Dec., pp. 1078-1082.

Not only the horizontal deviation of the optic axis from the visual axis (angle gamma) but the vertical deviation (angle delta) should be measured in order to make an accurate localization of intraocular foreign bodies and retinal tears. The methods of measuring these deviations are reviewed. In the case reported the foreign body appeared to be 1 mm. below the optic nerve with Comberg's method, whereas it was really 1 mm. above it.

J. Hewitt Judd.

Avgushevich, P. L. **Ocular traumatism and tetanus.** Viestnik Opht., 1939, v. 15, pt. 2, p. 79.

A report of two cases of tetanus following perforating ocular injuries, and a plea for the routine administration of tetanus antitoxin instead of foreign proteins in ocular injuries.

Ray K. Daily.

Berliner, M. L. **Cataract following the inhalation of paradichlorobenzene vapor.** Arch. of Ophth., 1939, v. 22, Dec., pp. 1023-1034; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1939, 90th mtg.

Paradichlorobenzene inhaled in sufficient quantities may produce severe toxic effects in human beings and in animals. It caused the death of guinea pigs and rabbits and produced a picture of vacuolation and necrosis of liver cells principally in the central portion of the liver lobule. No lenticular changes appeared except in one experimental rabbit which was fed the drug orally. Berliner presents two cases of jaundice, loss of weight, and cataract formation occurring in young women. The history in each case suggested a toxic hepatitis, due to continued exposure to the fumes of paradichlorobenzene. As with dinitrophenol, the changes in the lenses appeared as delayed reactions several months after the patients were removed from the influence of the fumes of this drug. The author pleads for a wide dissemination of this knowledge and for legislation requiring the manufacturers and distributors of this product to label the containers properly to this effect. (Discussion.) J. Hewitt Judd.

Comberg, W. **An important and simple aid in the magnet extraction of chips from the anterior chamber.** Klin. M. f. Augenh., 1939, v. 103, Dec., p. 600.

After the foreign body has been drawn by the giant magnet into the anterior chamber the patient is placed supine on the operating table. The fragment is then drawn with the hand magnet on to the upper part of the iris and then to one side. Here it can be extracted on the point of the hand magnet introduced through a small incision. C. Zimmermann.

Davidson, M. **Lens lesions in contusions.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 252-271.

Eber, C. T. **Foreign body in both orbits.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 318-319.

Livingston, P. C., and Walker, H. M. **A study of the effects of liquid mustard gas upon the eyes of rabbits and of certain methods of treatment.** Brit. Jour. Ophth., 1940, v. 24, Feb., pp. 67-97.

Twenty-three mature rabbits were used in these experiments. The findings indicated that the effect of mustard contamination of the eye can be considerably mitigated by treatment. The authors believe that corneal ulceration in the human eye can be arrested with ascorbic acid by means of a specially designed irrigating speculum which is described. Future study will determine how much time may elapse between the injury and the administration of the ascorbic acid. Whether some other substance, cheaper and more available than ascorbic acid yet equally effective, may be found is also open to future study. (Figures, tables.)

D. F. Harbridge.

Mattsson, Ragnar. **Three cases of transitory myopia.** Acta Ophth., 1939, v. 17, pt. 3, p. 314.

Three cases of transitory myopia are reported, each occurring during a

course of sulphanilamide therapy. The negative effect of homatropine speaks against a spasm of accommodation as the cause of the myopia. The author believes that the condition was allergic in nature, with the lens as the seat of the allergic process. Ray K. Daily.

Melanowski, W. H. **Extraction of nonmagnetic intraocular foreign bodies.** Arch. d'Opht., etc., 1939-1940, v. 3, no. 9, p. 769.

Four cases are described in which nonmagnetic foreign bodies (one lead, three copper) were extracted from the eyeball. The following conclusions were reached: (1) Extraction of nonmagnetic intraocular foreign bodies is possible by correct localization. (2) Localization methods of Sweet and Grudzinski are sufficiently exact to permit successful extraction. (3) The extraction of foreign bodies located in the anterior segment, especially in the neighborhood of the ciliary body, is greatly facilitated by Vogt's skeleton-free radiographic method and the application of Grzendzielski's brass clamp to the spot on the surface of the globe nearest to the foreign body. (4) Grasping forceps are very useful in withdrawing foreign bodies from the vitreous, but Holth's forceps in which the extremities take the form of flat perforated spatulas are preferable. (5) While the extraction of nonmagnetic intraocular foreign bodies presents many difficulties, a review of the literature shows that it is not always fruitless. (Bibliography, illustrations.)

Derrick Vail.

Rand, C. W., and Reeves, D. L. **Traumatic enophthalmos.** Surg., Gynec., and Obstetrics, 1939, v. 69, Oct., pp. 460-467.

Three cases of traumatic enophthalmos are reported together with a discussion of their symptoms, objective findings, and prognosis. The various theories of causation are reviewed, the authors favoring that of Shoemaker. According to this theory the enophthalmos is due to a rupture of Tenon's capsule or of the check ligaments thereby allowing the recti to retract the globe. John C. Long.

Rohrschneider, W., and Glauner, R. **Experimental investigations on the effect of fractional and protracted-fractional roentgen-radiation on rabbit lens.** Graefe's Arch., 1939, v. 140, pt. 4, pp. 700-708.

Lens opacities developed in nearly all the eyes which were subjected to doses of 1,000 R or more, whether treated by fractional methods or by a single dose. The latent period before the onset of lens changes and the extent of lens damage are less after fractional doses than after a single dose. The authors confirm the work of Gasteiger and Grauner (Amer. Jour. Ophth., 1938, v. 78, p. 690) and state that fractional radiation is far from harmless for the eye even with relatively small doses. C. A. Perera and U. Ollendorff.

Sironi, Luciano. **Electric cataract from industrial current and from lightning.** Rassegna Ital. d'Ottal., 1939, v. 8, Sept.-Oct., p. 545.

The author reviews the literature pertaining to electric cataracts and reports three personally observed cases, two from utility currents and one from a lightning flash. He points out that the lens is usually the only part of the eye to be affected, unless direct contact is made by the current and the eye tissues. The opacity of the lens generally appears after an interval of months or even a year. It is subcapsular, fre-

quently stellate, and more often affects the anterior than the posterior layers of the lens. The view is confirmed that the current need not traverse the head to lead to cataract formation. The three cases reported were operated upon for cataract with excellent visual results. (11 figures.) Eugene M. Blake.

Stallard, H. B. **An improvised eye-irrigator for use in the field.** Brit. Jour. Ophth., 1940, v. 24, Feb., pp. 53-57.

Description of a procedure for irrigating eyes damaged by poisonous gas during the war era. An improvised container for anti-gas eye lotion is described as is the organization for attending the wounded. (Figures.)
D. F. Harbridge.

Trantas, A., and Trantas, N. **Extraction of intraocular foreign bodies. Use of the diaphanoscope in diagnosis and localization.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 146.

The authors report the removal of four intraocular foreign bodies, two magnetic and two nonmagnetic. Their use of the diaphanoscope in localizing the foreign bodies is described.
George A. Filmer.

Trantas, A., and Trantas, N. **A new case of ophthalmia nodosa.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 142.

A report of the sixth case of caterpillar-hair ophthalmia seen by the authors in Athens. Nodules, edema, and vascularization of the cornea are described, as well as nodules on the iris.
George A. Filmer.

Tzanidès, T., Manoussis, S., and Moschos, N. **Extraction of metallic intraocular foreign bodies.** Bull. Soc. Hellénique d'Opht., 1939, v. 8, April-June, p. 158.

The authors review a series of cases and discuss their methods. They prefer to use the small magnet through a scleral incision. George A. Filmer.

Zenkina, L. V. **Treatment of ocular burns by transplantation of cadaver conjunctiva.** Viestnik Opht., 1939, v. 15, pt. 2, p. 28.

Three cases are reported, all with good results. The pain abated the day after the transplantation of cadaver conjunctiva preserved at low temperature. The transplant took in all three cases, the better the more vascular its bed. The surrounding conjunctiva reacted by marked chemosis, and the corneal process was arrested. After a time the transplant was absorbed. The author believes that the transplant acts as a local irritant and stimulates local regenerative processes.
Ray K. Daily.

17

SYSTEMIC DISEASES AND PARASITES

Charlin, Carlos. **Ocular scrofula in the adult.** Ann. d'Ocul., 1939, v. 176, Nov., pp. 813-822.

Scrofula is described as a disease process having as a basis tuberculosis of the lymphatic system. Secondary manifestations are dermatitis, rhinitis, conjunctivitis, and keratitis. Charlin advises nonspecific systemic and local treatment for all cases. Those which are resistant to such procedures should be given specific tuberculin therapy unless there is definite contraindication. Complications of tuberculin treatment may appear as ocular focal reactions or general systemic reactions, either of which suggests that the dose was excessive and should be reduced to one-

tenth of the previous dose. Treatment on an uninterrupted schedule is advised; this consists of eight or ten weekly injections, then a rest of two or three months, followed by resumption of treatment. Four illustrative cases are described.

John M. McLean.

Gözcü, N. I., and Gördüren, S. **Clinical researches in some cases of tularemia observed in the country.** Türk Oft. Gazetesi, 1938, v. 2, pt. 8, p. 331. (French translation: 1937, v. 2, pt. 8, p. 416.)

In the ten-year epidemic of tularemia which raged in the Lüleburgaz region, the disease appeared in the summer months and subsided towards the end of autumn. In 75 observed cases, 17 were of the oculoglandular type (16 acute conjunctivitis and one suppurative dacryocystitis). The right eye was more frequently affected.

George H. Stine.

Prendergast, J. J. **Ocular leprosy in the United States,** Arch. of Ophth., 1940, v. 23, Jan., pp. 112-137; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1939, 90th mtg.

Of 350 cases of ocular leprosy at the national leprosarium at Carville, Louisiana, 29 percent were blind or nearly blind in one or both eyes and 91 percent had ocular involvement of one form or another. Mexicans have an apparent relative immunity to ocular involvement. There are immune protected areas in the lids and xanthelasma is common. It was found that the cornea was the most vulnerable ocular tissue, and that lesions in the retina, optic nerve, and lens were rare. The iris showed all gradations of involvement from a mild degree of swelling with obliteration of the anterior pattern and ectropion uveae to almost complete fibrosis and atrophy. In the ciliary body there was usually a scattering of chronic inflammatory cells and bacilli around the major arterial circle and in the sclera the lesions were almost always confined to the corneoscleral junction. The mode of infection of the eye was thought to be endogenous. Glaucoma was uncommon. Protection of the leprous eye is an important prophylactic measure. Quinine bisulphate ointment and thyroxin administered locally gave fair results in clearing the corneal infiltrates. Dionin and chaulmoogra oil were of no avail. Protein shock was beneficial in the treatment of acute lesions. The leprous eye, while not tolerating surgery very well, rarely shows postoperative infection. (Discussion.)

J. Hewitt Judd.

Ramirez, F. **Adie's syndrome.** Arch. Uruguayos de Med., Cir., y Especialidades, 1939, v. 15, Aug., pp. 124-134.

The patient, a woman of 35 years with negative Wassermann reaction, had noticed that when she looked afar and then near the vision at close range took some time to become distinct. There was general absence of tendon reflexes. An oculist had made a diagnosis of Argyll Robertson pupil.

W. H. Crisp.

Riddel, W. J. B. **Multiple factors in hereditary eye disease.** Trans. Ophth. Soc. United Kingdom, 1939, v. 59, pt. 1, p. 275.

The recent knowledge concerning nonpathologic inherited factors such as the character of the blood group is given as basis for special interest in the attempts being made to correlate the nonpathologic framework with inheritance of pathologic conditions such as

color blindness and hemophilia. A large pedigree manifesting color blindness, blue sclerotics, deafness, and brittle bones is given. Beulah Cushman.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Anderson, J. R. **Blindness in private practice.** Med. Jour. Australia, 1939, v. 2, Nov. 4, pp. 680-688.

In a series of 12,240 private patients seen in Melbourne, 2.2 percent were binocularly blind and 5.5 percent were monocularly blind. In the order of their importance, the chief causes of binocular blindness were glaucoma, congenital and hereditary diseases, myopia, vascular disease, syphilis, diabetes, focal sepsis, and trachoma. The causes of monocular blindness were glaucoma, vascular disease, trauma, amblyopia ex anopsia, retinal detachment, myopia, focal sepsis, and industrial trauma. The author urges that registration of blindness be made compulsory in order to better attack such problems as the inheritance of blindness, the development of myopia, the prevention of injury, and the arrest of glaucoma. (24 tables.)

John C. Long.

Chance, Burton. **Sir Joshua Reynolds and his blindness and death.** Ann. Med. Hist., 1939, v. 1, Nov., pp. 487-506.

This is a rather detailed account of Sir Joshua Reynolds' life and work. After an extremely busy career as a portrait painter, he ceased active work in his 66th year, because of pain and progressive visual failure of the left eye. Shortly after the onset of blindness in the left eye, his general health began to fail and he suffered from anorexia and abdominal pain. He died less than three years after his retirement, apparently with no impairment of the right eye. An autopsy revealed an enlarged liver weighing eleven pounds. While no definite diagnosis can be made from the preserved records, the author thinks that the cause of blindness and death was malignant melanoma with liver metastases.

John C. Long.

Csapody, István de. **The ten-year activities of an eye department and its role in the education of oculists.** Szemészet, 1939, v. 2, Dec., p. 21.

A detailed description of a 46-bed hospital is given with statistical enumeration of the activities carried on in it during the last decade.

R. Grunfeld.

English, B. C., Shmukler, B. C., and Cowan, A. **Evaluation of three methods commonly used in examination of eyes of school children.** Arch. of Ophth., 1939, v. 22, Dec., pp. 1068-1075.

An analysis of the results of the ophthalmologic examination of 111 children by the visual safety telebinocular method (Betts), the visual test recommended by a joint committee of the National Education Association and the American Medical Association, and the ordinary routine medical inspection in school indicates that the Betts method is probably the most useful and thorough method of examination from a psychologic standpoint, but for the purpose of these examinations the medical rather than the psychologic standpoint is preferred. Investigation also seems to prove that the ordinary method of routine medical inspection to determine visual defects in children is unreliable. J. Hewitt Judd.

Esser, A. A. M. **The eye and alcohol in antiquity.** Klin. M. f. Augenh., 1940, v. 104, Jan., p. 91.

This report, based on original literary resources, assembles the common knowledge displayed by classical antiquity as to the effects of alcohol on the eye. C. A. Perera and U. Ollendorff.

Friedenwald, Harry. **The American Ophthalmological Society; a retrospect of seventy-five years.** Arch. of Ophth., 1940, v. 23, Jan., pp. 1-21; also Trans. Amer. Ophth. Soc., 1939, v. 37, p. 51.

This is a review of the history of the scientific and professional achievements of this society from its founding in 1864 to the present time.

J. Hewitt Judd.

Geulikman, O. B. **Blindness in Russian Mongolia, and its causes.** Viestnik Opht., 1939, v. 15, pt. 2, p. 69.

Russian Mongolia is one of Russia's most primitive and backward republics, culturally, hygienically, and socially. The percentage of blindness is 4.8 percent. In the etiology, first place is taken by diseases of the cornea and atrophy of the eyeball, and second by syphilis. To diminish this high percentage of blindness it will be necessary to raise the economic, cultural, and sanitary standards of living and to provide ophthalmologic service in the rural communities as well as in the villages.

Ray K. Daily.

Oak, L. and Sloane, A. E. **The Betts visual sensation and perception tests; a method of detecting school children requiring ocular attention.** Arch. of Ophth., 1939, v. 22, Nov., pp. 832-843.

A carefully controlled study of 200 children, ranging in age from 6 to 15 years, indicates clearly that the telebinocular tests give both qualitative and quantitative disparities. They screen out too many children for practical purposes, and also miss many who need to be referred to the ophthalmologist. J. Hewitt Judd.

Shiga, H. **Trachoma in Japan.** Amer. Jour. Ophth., 1940, v. 23, March, pp. 306-314.

Spoto, Francesco. **Trachoma and other eye diseases in Italian Somaliland.** Rassegna Ital. d'Ottal., 1939, v. 8, Sept.-Oct., p. 588.

This is an article of general information regarding the geography, climate, diet, and diseases of the native population. (2 figures.) Eugene M. Blake.

Ubaldo, A. R., and Ocampo, G. E. **Blindness in Children.** Jour. Philippine Islands Med. Assoc., 1939, v. 19, Aug., p. 483.

A survey of the causes of blindess in children under 14 years of age observed at the Philippine General Hospital. The five major causes in the order of their importance were phlyctenular keratoconjunctivitis, injury, xerophthalmia, tumor (glioma), and cataract. Phlyctenular keratoconjunctivitis constituted 26.7 percent of all ocular diseases. The authors point out that keratoconjunctivitis and xerophthalmia present a social and economic as well as a medical problem. Although 237 cases were provisionally diagnosed as trachoma, none of these were blind. The authors suspect that most of the cases diagnosed as trachoma were really follicular conjunctivitis. The glioma cases were almost always received hopelessly late.

John C. Long.

Yanes, R. **The prevention of blindness.** Rev. Cubana de Oto-Neuro-Oft., 1939, v. 8. Jan-Feb., p. 19.

The author outlines very briefly a national program for the prevention of blindness. Edward P. Burch.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Olmsted, J. M. D., and Morgan, M. W., Jr. **Refraction of rabbit eyes in unexcited and excited states.** Amer. Jour. Physiology, 1939, v. 127, Oct. 1, p. 602.

The authors found that the rabbit eye in an unexcited state was more hypermetropic than the human eye at rest. Excitement caused increase in hyperopia concurrently with dilatation of the pupil and homatropine also increased the degree of hyperopia. The writers regard this as evidence of sympathetic innervation of the ciliary muscle. Theodore M. Shapira.

Santoni, Armando. **Researches on the structure and metabolism of the retina of the frog during the process of regeneration.** Boll. d'Ocul., 1939, v. 18, Jan., pp. 27-43.

Degenerative retinal changes were produced by cutting the optic nerve and the corresponding blood vessels. The degenerative retinal process began after 24 hours; three months later the first signs of regeneration were seen. After 150 days the ocular cavity was lined by a membrane which, however, did not show the normal histology of the retina. During the regeneration period the metabolism of the retina showed a slight increase of aërobic glycolysis. (6 figures.)

M. Lombardo.

ELEVENTH SCIENTIFIC MEETING OF ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY

As this issue goes to press a notice of the program of the Eleventh Scientific Meeting of the Association for Research in Ophthalmology has been received. This program will be presented at the Biltmore Hotel, New York, on June 11, 1940. Its importance justifies a last-minute inclusion in this space.

9:30 A.M.

Effect of pressure on conical cornea. T. L. Terry, M.D., Julian F. Chisholm, M.D., Massachusetts Eye and Ear Infirmary, Boston, Massachusetts.

The effect of certain physical and chemical stimuli on the caliber of the retinal vessels in man. Irving Puntenney, M.D., Department of Ophthalmology, Northwestern University Medical School, Chicago.

Some pharmacological experiments on isolated segments of mammalian iris. Erich Sachs, M.D., Parker Heath, M.D., Department of Ophthalmology, Wayne University Detroit, Michigan.

Passage of horse serum from the blood stream into the aqueous humor of normal and immunized animals. Loren Guy, M.D., Department of Ophthalmology, Cornell University Medical College, New York.

2:30 P.M.

Cultivation of conjunctivitis- and keratitis-producing agents on the chorio-allantoic membrane of the chick embryo. Phillips Thygeson, M.D., Department of Ophthalmology of the College of Physicians and Surgeons, Columbia University and the Institute of Ophthalmology, Presbyterian Hospital, New York.

A comparative study of the effects of mecholyl, doryl, eserine, pilocarpine, atropine, and epinephrine on the blood-aqueous barrier. Kenneth C. Swan, M.D., William Hart, M.A., Department of Ophthalmology, University of Iowa, Iowa City.

The mucopolysaccharide acid of the cornea and its enzymatic hydrolysis. Karl Meyer, M.D., Ph.D., Eleanor Chaffee, Department of Ophthalmology of the College of Physicians and Surgeons, Columbia University and the Institute of Ophthalmology, Presbyterian Hospital, New York.

Dark adaptation of normal adults on diets deficient in vitamin A. Lincoln F. Steffens, M.D., Hugo L Bair, M.D., Charles Sheard, M.D., Mayo Clinic, Rochester, Minnesota.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth

640 S. Kingshighway, Saint Louis

News items should reach the Editor by the twelfth of the month

Deaths

Dr. Abner G. Greenstreet, Seattle, Washington, died January 1, 1940, aged 76 years.

Miscellaneous

The Eighteenth Annual Summer Graduate Course in Ophthalmology and Otolaryngology, Denver, Colorado, will be held July 29 to August 10, 1940. Following is the list of guest teachers in ophthalmology: Dr. Ramon Castroviejo, New York City; Dr. John Hargreaves, Randolph Field, Texas; Dr. Placidus J. Leinfelder, Iowa City, Iowa; Dr. Isaac S. Tassman, Philadelphia; Dr. Theodore L. Terry, Boston; Dr. Sydney Walker, Chicago.

Collaboration with professional groups of wide diversity, having a common interest in the conservation of vision, is outlined in the twenty-fifth annual report of the National Society for the Prevention of Blindness, entitled "All the world to see." Doctors, nurses, school teachers, social workers, safety engineers, government and private health agencies, and civic organizations throughout the United States are assisting the movement for protection of eyesight, the report points out.

"It is difficult to measure accomplishment during the past year because results are frequently intangible," explains William Fellows Morgan, president of the Society, in a preface to the report. "It may be noted, however, that there is an increase in state and local programs for sight conservation; that official health, welfare, and educational bodies are incorporating sight conservation activities in their programs; and that there is growing interest and understanding on the part of the public generally.

"Each year marks advances in the fields of science, education, social service, and government which bring the National Society for the Prevention of Blindness nearer its goal; the time when all the world may see with clear, healthy eyes. As leader in the organized movement for conservation of eyesight, the National Society for the Prevention of Blindness also stimulates progress in those countries throughout the world which are affiliated with the International Association for Prevention of Blindness."

There are approximately 150,000 blind persons in the United States, said Mrs. Eleanor Brown Merrill, Executive Director, in making public the National Society's annual report. "The tragedy in the lives of these individuals and their families is heightened by the fact that blindness is preventable in the majority of cases," Mrs. Merrill commented. "The underlying reason for loss of sight, whether it be the result of disease or accident, is usually ignorance. Our work, therefore, is concentrated largely on pointing the way. We try to keep abreast of the scientific advances in medical and pedagogical knowledge and to inform the public in popular language of such advances and how they may be applied practically in saving sight."

Studies on the causes of blindness, which are now in progress, will disclose the extent of this problem. Eye records have been received from schools and classes for the blind, and similar studies of the adult blind are being made. Analysis of such case records is showing the Society where to train its floodlights of public education and influence.

In view of the fact that more than 16 percent of the blind population in the United States lost their sight as a result of syphilis or gonorrhea, the report points out, the Society takes an active interest in the problem of venereal-disease control. There are now 30 states which have premarital-examination laws and 17 states which have provisions for compulsory Wassermann tests for expectant mothers.

Discussing sight-saving classes for the education of school children with seriously defective vision, the report notes an increase of 15 such classes during the past year, bringing the total number to 602. The Society participated in the giving of special courses at five colleges and universities for the training of sight-saving-class teachers and supervisors. During the past year, also, a five-year intensive demonstration program on the subject of eye health of college students was completed. Among the projects undertaken is the improvement of devices and methods for testing the eyes of college students and for securing uniform records.

Because of the large number of serious eye accidents in industry, many of which result in blindness, extensive research into ways of eliminating industrial eye hazards has been carried on by the Society, and the findings will be published in a forthcoming revised edition of "Eye hazards in industrial occupations."

As part of its campaign of public information, the Society distributed last year approxi-

mately 300,000 copies of various publications. Income during the year was $131,000 and expenditures amounted to $167,000, necessitating the use of $36,000 from the reserve fund. Financial support is received through voluntary contributions from 17,000 members and donors in all parts of the country.

Societies

The Eye Section of the Philadelphia County Medical Society presented the following program on April 4, 1940: Diabetes with bilateral lens opacities, by Dr. Solomon S. Brav; Some postoperative and posttraumatic ocular pathology, by Dr. Patrick J. Kennedy; Case reports, by Dr. K. L. Roper and Dr. Carl Breisacher.

In coöperation with the Frank E. Bunts Foundation, the Cleveland Ophthalmological Club recently gave a post-graduate course at the Cleveland Clinic. The course was under the able direction of Dr. A. D. Ruedemann, ophthalmologist in chief of the Cleveland Clinic. The following is a list of the speakers who took part in the course and their subjects: Dr. Ralph I. Lloyd of Brooklyn, New York, "Types and etiology of macular lesions" and "The differential diagnosis of corneal lesions." Dr. Albert Brown of Cincinnati, "The use of physical agents in the treatment of diseases of the eye and orbit." Dr. Daniel B. Kirby, New York City, "Complications of cataract surgery and methods of handling." Dr. Harvey Thorpe, Pittsburgh, "The clinical value of the slitlamp with special reference to the iris and the lens." Dr. Hugh McKeown, New York City, "End results in over 500 cases of detachment of the retina."

The third clinical meeting of the Wilmer Institute Residents Association was held at the Johns Hopkins Hospital in Baltimore on May 2 to 4, 1940. This association comprises the former members of the staff of the institute who have been appointed and served as resident ophthalmologists in the Johns Hopkins Hospital. The purpose of the annual meeting is to afford an opportunity for these former residents to renew their ties with the hospital and to review the clinical and experimental investigations in progress in the Wilmer Institute.

Personals

Dr. W. E. Bruner, professor emeritus of ophthalmology, Western Reserve University, School of Medicine, is enjoying a six weeks' holiday at his winter residence in Sarasota, Florida.

Dr. Paul G. Moore, assistant clinical professor in ophthalmology, Western Reserve University, School of Medicine, recently gave the Holden Health Lecture at the Cleveland Academy of Medicine. His subject was "The changing eye."

At the March dinner meeting of the Cleveland Ophthalmological Club, the guest speaker was Professor Alan Woods, director of ophthalmology, Johns Hopkins Hospital. Dr. Woods gave an illuminating and interesting lecture on "Ocular tuberculosis." Preceding the regular meeting there was a clinical presentation of interesting eye cases given by members of the staff of the University Hospitals Ophthalmological Department.

The February dinner meeting of the Cleveland Ophthalmological Club was addressed by Dr. Wendell Hughes of New York City. He spoke on "Dacryocystorhinostomy." His lecture was illustrated by lantern slides and movies. The ophthalmological staff of St. Luke's Hospital presented several eye cases prior to the regular meeting.

With the approval of the Surgeon General of the Navy, Ross T. McIntire, Dr. Benjamin Ahl is pursuing post-graduate studies in Ophthalmology at the Western Reserve University Hospitals, Cleveland, Ohio. Dr. Ahl, who is now on recruiting service, expects to be stationed in Cleveland for two years.